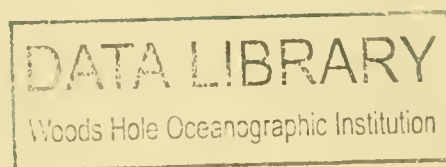
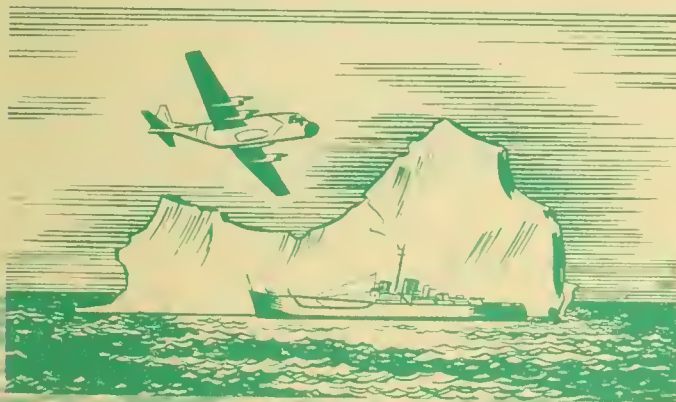


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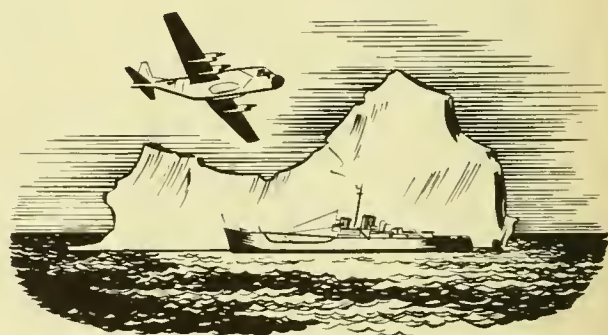
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# REPORT No. 11

CG 373-11

## OCEANOGRAPHY OF THE GRAND BANKS REGION OF NEWFOUNDLAND IN 1965

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## **Abstract**

Three oceanographic surveys were conducted in the vicinity of the Grand Banks of Newfoundland in support of International Ice Patrol operations 1965. Measurements of temperature and salinity obtained from serial Nansen bottle observations were used to determine the dynamic topography, a principal factor in studying the most probable drift of icebergs endangering shipping in this area. A short check survey of one standard section was conducted during the season in order to detect any short term changes in the Labrador Current. Subsequent analysis of selected oceanographic sections was accomplished to calculate the volume flow and heat transport through these sections. In addition, an isentropic analysis was undertaken in order to make a comparison with the circulation deduced from the dynamic topography.

A change in vertical sampling technique was attempted in order to define more accurately the maximum and minimum points in the distribution of temperature and salinity.

Studies of iceberg deterioration and specific drift factors were initiated during Ice Patrol 1964 and were continued during 1965 with some increase in emphasis.



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# Oceanography of the Grand Banks of Newfoundland in 1965

by

RONALD C. KOLLMEYER, U.S. Coast Guard

## Introduction

The Ice Patrol surveys during 1965 were conducted in a somewhat different manner from the standard sampling routine of the past. A new oceanographic station array was established paralleling the old standard surveys in some areas and differing considerably in others. Figure 1A shows the old trackline of the southern survey and the new trackline used in 1965. The purpose of revising the trackline was to reach a compromise between adequate sampling of the area while keeping the survey as synoptic as possible. The new station array included 62 stations compared to 97 stations of the previous method and allowed completion in 7 days in lieu of 14 days.

The standard sections of previous years have retained their designations in the new station array despite their relocation. Their new positions are not significantly different and allow comparison with historical Ice Patrol data. Figure 1A shows the section designations under the new and the old station arrays.

The standard treatment has been given the data as in past years with the exception of the volume and heat flow comparison for the standard sections. Annual volume and heat flow comparisons lose their significance unless adjusted for time. They are virtually meaningless unless compared to flow buildups and declines irrespective of the specific calendar survey dates. Past data indicates the major buildup and decline in the volume flow of the Labrador Current can occur anytime during the spring. This requires that the data must be adjusted in time by volume flow maximums in order to make comparisons on an annual basis. It will be shown in the following sections that monthly surveys will not provide the information required to define the accelerations of this system. Past data analysis techniques have not even shown the volume flow trends which would allow an annual time matching of the flow peak or peaks.

The sampling of the water mass was accomplished by first conducting an electronic bathythermograph lowering to 410 meters at each station. Nansen bottles were then hung at levels that would obtain temperature and salinity data which would best describe the water column. The merits, results, and comparisons of this technique are examined in a following paper.

Some methods of presentation, new to Ice Patrol, have been attempted in an effort to analyze the data more effectively. Ultimately, they may lead to an understanding of the circulation in the area which will allow formulation of better sampling techniques and possible prediction of current changes necessary for the solution of the berg tracking problem.

## NARRATIVE

### General

Three oceanographic cruises were conducted by USCG cutter *Evergreen*, a 180-foot tender class oceanographic vessel, in support of the International Ice Patrol during the spring and summer of 1965. A summary of the location and extent of each cruise follows.

The first cruise began on 30 March 1965, with the occupation of *Evergreen* Station 9235 on the southwestern slope of the Tail-of-the-Banks and proceeded northward with serial stations terminating at station 9296 on the Grand Banks west of Flemish Cap on 7 April 1965. This cruise was designed to delineate the three principle water types in the area, namely, the Labrador Current Water, Mixed Water, and Atlantic Current Water, and to provide, within 12 hours of observation, vertical temperature distribution and dynamic height at each station to commander, International Ice Patrol. Serial stations 9253 through 9260 were reoccupied as stations 9298 through

9306 on 11 and 12 April 1965, and referred to herein as the check survey to detect any changes in the horizontal and vertical distribution of water mass types and associated dynamic properties. The first cruise was terminated on 12 April 1965.

During the second cruise, which lasted from 24 April to 12 May 1965, *Evergreen* occupied serial stations 9313 to 9351 to provide a dynamic topographic chart of the water over the northeastern slope of the Grand Banks. These stations, which were occupied during the period 7 May to 10 May 1965, were in eastward oriented sections terminating at the latitude of Flemish Cap and represent an attempt to define any easterly branching of the Labrador Current.

The third cruise began with the occupation of station 9352 on 19 May 1965. A line of serial stations running east to the northern tip of Flemish Cap was occupied to provide overlap with the sections completed on the previous cruise. Serial stations were occupied down to the Tail-of-the-Banks which approximated those occupied during the first cruise. Occupation of station 9408 on 25 May 1965, completed the survey for the season.

### Additional Projects

As a part of a continuing study of iceberg drift and deterioration, a series of photographs, supported by sextant angles and range finder distances, were taken at 30-degree intervals around a berg to permit detection of mass wastage. These observations were made at approximately 24-hour intervals during the period from 26 April to 6 May 1965. A track of the drift of the same berg was maintained by hourly navigational positions obtained by radar reference to a buoy from 26 to 29 April 1965. Experimental dye-marking of the berg selected for these studies was also performed.

A study of the effect of pH of seawater upon its electrical conductivity, as utilized in salinity measurements with the inductive salinometer, was conducted during the first cruise as was a study of the possibility of classification of surface water type by Forel Color Scale. Inconclusive results were obtained and no data is presented.

During the first cruise an investigation was made of the steady state conditions presumptive in geostrophic circulation by means of analysis of electronic bathythermograph (ELBT) traces. The traces obtained gave indications of gross changes in the thermal structure over all periods covered by the study (6-minute to 1-week scales).

### Instrumentation

Teflon-lined water sampling bottles of the Nansen type, manufactured by the Ballauf Manufacturing Co. or the United Machine Co., were used during each cruise. Temperatures were measured with protected deep-sea reversing thermometers mostly of Richter & Wiese manufacture, but with some manufactured by G. M. Manufacturing Co., Kahl Scientific Instrument Corp., and Walter H. Kessler Co., Inc. Thermometer performance was continually monitored by pairing and intercomparison. The following standard deviations from the accepted paired average reflect thermometer performance during the season.

Cruise	Standard deviation ( $^{\circ}$ C)	Number of comparisons
1st.....	$\pm 0.005$	342
2d.....	$\pm .007$	177
3d.....	$\pm .008$	294

Depths of observation are based on wire angle geometry and thermometric computations from unprotected deep-sea reversing thermometers. The salinity of each seawater sample collected was measured with an RS-7A inductive salinometer manufactured by Industrial Instruments Corp. Forty-one replicate salinity samples were intercompared using a Hytech Corp. 6210 inductive salinometer which yielded a standard deviation of  $0.007^{\circ}/\infty$ . The salinity determination procedures used were those described by Morse (1963). It is considered that the precision of measurement was within  $0.005^{\circ}/\infty$  and that the accuracy of the reported salinities is  $\pm 0.01^{\circ}/\infty$ .

Depth to the bottom at each station was determined with an Alpine Precision Echo Sounder Recorder (PESR).

All observed data were processed by a PDP-5 digital computer manufactured by the Digital Equipment Corp. The computer was programed for the correction of reversing thermometers and determination of thermometric depth; computation of sigma-t, specific volume anomaly and dynamic height integration; and computation of volume transport. The programing of the computer has been described in greater detail by O'Hagan (1964), and Morse and O'Hagan (1964).

At each station a Hytech Corp. electronic bathythermograph (ELBT) Model 480 MOD I,



was used to determine the vertical thermal gradient to 400 m. to facilitate selection of sampling depths for the subsequent Nansen cast. As a result vertical thermal gradient sampling rather than standard depth sampling was accomplished.

A small shipboard fabricated marker buoy of light construction, floated by 12 inner tubes riding to 570 fathoms of nylon and dacron line secured to a 10-foot length of chain and a 75-pound danforth anchor was used in conjunction with the Hytech ELBT for a preliminary and cursory internal wave study. This buoy was lost due to a loss of floatation.

For iceberg drift studies a Geodyne Corp. toroidal fiberglass buoy equipped with a tripod mast, antenna array, and Motorola Co. radar transponder, Model SST-133X, was moored with a fixed bridle, swivel, ballast ball, 120 fathoms of 1 inch braided nylon, one shot (15 fathoms) of one-half inch anchor chain and a 75-pound danforth anchor in a reference position. *Evergreen's* radar was used hourly to determine navigational positions and the drift track of the berg with reference to the buoy. Horizontal control is estimated to be valid within 200 to 300 yards. The buoy was an unqualified success, operating at radar ranges of up to 12 miles and up to 70 hours on a single charge of the two serial 12 volt standard truck type, lead acid cells.

Twin drogues made of 28-foot cargo parachutes suspended at 10 and 70 meters depth from a buoy of truck type inner tubes and bamboo poles, and equipped with a radar reflector and light were used as an adjunct to the iceberg drift study for acquiring subsurface current information.

### Personnel

The oceanographic work of the first and second cruises was under the direction of Lt. Comdr. Richard M. Morse, USCG who was assisted by Lt. Comdr. Ronald C. Kollmeyer, USCG; Mr. Thomas C. Wolford, oceanographer, USCG; Mr. Robert B. Elder, oceanographer, USCG; and Ens. Melvin S. Swanson, USCGR. Lieutenant Commander Kollmeyer directed the third cruise assisted by Mr. Wolford and Ensign Swanson. Technical assistants for the entire season were David C. Lockhart, aerographer's mate first class and Edward S. Olszewski, sonarman second class. Dennis L. Noble, aerographer's mate first class; John T. Nichols, sonarman second class; and James D. Brower, aerographer's mate third class assisted during the first and second cruises; and

William H. Harrell, sonarman first class; William E. Heller, aerographer's mate second class; and David J. Wood, sonarman second class assisted during the third cruise.

## DYNAMIC HEIGHT CHARTS

### General

The dynamic height topographic charts of the sea surface, for the Grand Banks region of Newfoundland, are presented in figures 2A through 5A. They were constructed from data obtained on the first, check, second, and third surveys conducted during Ice Patrol 1965.

The first and third survey charts, figures 2A and 5A, represent data obtained using the new station array. They describe the surface currents, their velocities and directions, as determined from dynamic computations. The check survey, figure 3A, consisting of section U and a portion of the the section immediately to the south was obtained approximately 1 week after the occupation of these same stations on the first survey. The purpose of this immediate reoccupation was to examine short term changes that may occur in the flow pattern of the Labrador Current not detected in the past due to intervals of a month or more between surveys.

The second survey chart, figure 4A, is a supplemental survey of the northern area, adjacent to the main region of interest. It provided the characteristic description of the easterly flow and southward turning of the Labrador Current prior to its entering the area of major interest.

The third survey, figure 5A, describes the circulation in the area of major interest during the late spring. Flow patterns are quite different than found in early spring as seen in figure 2A.

The designated section U is noted on figures 2A, 3A, and 5A. This section includes the most interesting flow patterns of the region. Starting at the westernmost end of the section, the typical high stand of Banks water is always observed which grades into the main southward flowing stream of the Labrador Current. Just to the east of this current, a trough or low stand of mixed water is found with the northward flowing Atlantic Current forming the eastern boundary of the section. The circulation changes which occurred in this section between the several surveys will be discussed in detail in the following sections.

## Treatment of Data

Numerical integration of the anomaly of specific volume, based on the temperature and salinity distribution obtained at each station, was accomplished on shipboard using a Digital Equipment Corp. PDP-5 computer. All deep sea reversing thermometers were corrected by the computer thus eliminating all hand computations. Actual observations were used as data inputs for the computation of dynamic heights. No scaled data for standard depths, other than the 1,000-meter reference level, were used in the computations. The programs used are described by O'Hagan (1964).

Daily transmissions of the computed dynamic heights for each station occupied, along with the temperature distribution down to 150 meters, were made to Commander, International Ice Patrol, Argentia, Newfoundland. This allowed the immediate construction and use of portions of the sea surface topography charts for iceberg drift prediction.

## Chart Discussion

The first survey chart, obtained during 30 March to 7 April 1965, figure 2A, shows the Labrador Current flowing south along the 100-fathom curve. At the Tail-of-the-Banks, part of the current flows west and another portion recurves to the east forming a pool of quiet water. Some filaments in this area turn and flow northward contributing to the mixed water area of the trough. This trough area is the region of current reversal where the Labrador Current flows south on the western side and the Atlantic Current flows north on the eastern side. The water in this region has a low specific volume. It is made up of a mixture of Labrador Current water and Atlantic Current water giving a water mass characteristic between the two as seen in the T-S curve of figure 6A. This mixture produces a water mass of a characteristically low dynamic stand compared to the much higher topography towards the Banks and towards the Atlantic Current to the east. For this reason it is referred to as the low or trough of the circulation pattern. This is a characteristic feature generally found in the vicinity of the 1,000-fathom curve and sometimes extends as far south as the Tail-of-the-Banks.

The meanders of the Atlantic Current outline the pool of water formed to the east of the tail. This appears to be supplied by the water of the

Labrador Current spilling into the area and is a normal circulation feature found in past years.

An area of contour uncertainty exists in the northeast part of the current chart, figure 2A, at 46°30' N., 48°00' W. Insufficient data in the area prevents the determination of flow direction from dynamic topography alone and will be discussed in the following section in isentropic analysis.

The check survey chart, obtained during 11-12 April 1965, figure 3A, represents an interesting reoccupation of section U within 9 days of the first occupation. The 971.1 dynamic meter streamline, nonexistent in that area on the first survey, was found. In addition, the 971.0 dynamic meter streamline was found to have shifted east by about 30 miles, while the trough feature shifted eastward less than 10 miles resulting in a swifter flowing Labrador Current.

The second survey, 7-10 May 1965, figure 4A, shows the Labrador Current tracking along the 100-fathom curve with some lateral filaments spilling onto the Banks as it turns to the south. The 971.0 and 970.9 dynamic meter streamlines are in much the same position, passing through section F, as on the first survey. The 971.1 dynamic meter streamline was not observed, however, contours up to 971.08 dynamic meters are drawn and indicate that lighter water was further up on the Banks. This was also reflected in figure 3A, the check survey, where 971.1 dynamic meter streamline appeared well up on the Banks in section U.

The third survey, 19-25 May 1965, figure 5A, showed the Labrador Current as a strong uniform flow along the 100-fathom curve from 47°30' N. to 43°00' N. The characteristic trough was greatly elongated and the pool of quiet water found during the first survey was missing. The streamlines of the Atlantic Current tended to turn north at the Tail-of-the-Banks without describing any low velocity or stationary pool of water. A cyclonic eddy occurred to the east at 44°00' N., 46°00' W. This eddy or gyre exhibited water characteristics similar to those found in the pool of water, described by the first survey data, at the Tail-of-the-Banks. The eddy appeared to be the result of the pinching off of the pool and its subsequent movement to the northeast. This pinching off of an eddy is a phenomena exhibited by Gulf Stream filaments and described by Fuglister et al. (1951). Insufficient



data prevents a detailed description of this eddy, however, its presence is apparent.

## GENERAL CIRCULATION

### Volume and Heat Flow

A summary of volume flow through the designated section U is given in table IA. The computations were made by a modified method described by Jakhelln (1936). It is interesting to note that the volume flow through section U doubled during the 9-day interval between the section occupation on the first survey and the check survey. The volume flow then remained relatively constant between the check survey and the third survey. It appears that a radical change took place on the Banks between the first and check surveys. Not only is a greater volume observed on the check survey but a significantly warmer mean temperature and higher minimum temperature is also found. The third survey volume flow remains high; however, the mean temperature, minimum temperature, and minimum salinity drop below the first survey values indicating that the Labrador Current is exhibiting its full flow characteristics.

The general water characteristics of the Labrador Current between the first and third surveys are quite different. Figure 7A shows a T-S plot of the Labrador Current. The points are mean values (for the given depths) of all stations on each of the first and third surveys situated in the southward flowing stream. This is similar to figure 6A showing the Labrador Current characteristics for the entire season. On the first survey, the water was less stratified than during the third survey. This is indicated in figure 6A by the smaller sigma-t change across the same depth interval on the first survey than on the third, particularly from 100 to 150 meters. A comparison of the water mass between the two surveys shows the third survey found colder, less saline water down to a level between 100 and 150 meters and then a sharp density increase with warmer, more saline water below 150 meters. This density gradient defines the depth limits of change of the Labrador flow. This change at depth of the density structure between surveys can be traced to spring changes in the east-west slope of the  $\sigma_t$  surfaces resulting in greater stratification, and will be treated more fully in the following chapter on isentropic analysis.

### Dynamic Height Changes

A surface dynamic height plot of the stations of section U on the first, check, and third surveys, figure 8A, shows that in 9 days a change in height of the inboard station occurred without a significant change in the trough dynamic height. The trough is located in water which is a mixture of the Labrador Current and the Atlantic Current and does not show the extreme characteristics of either current system. Apparently the abrupt change in elevation of the stations on the Banks and the increase in volume flow is related to the change of water characteristics on the Grand Banks and continental slope as shown on the temperature-salinity sections, figure 9A. These sections were constructed from the temperatures and salinities of stations in section U on the first, check, and third surveys.

The temperature and salinity distributions of section U during the three occupations are clearly shown in figure 9A. The first survey reveals that the cold water is generally confined to the surface along with reduced salinity required for stability, probably reflecting the results of disintegrating sea ice. The check survey shows colder water of low salinity to be subsurface and connected to a colder water mass on the Banks. The density of this water is less than the first survey water at the same depth indicating that it probably did not result from surface sinking. By the third survey the situation had again changed showing a core of cold water off the Banks, with even lower salinity than cold water of the previous survey. The salinity decreases as the Banks are approached indicating that different water mass has also arrived there. The temperature of the Banks water has also increased above what it was earlier, but this can be explained by the warmer air temperatures as summer approaches.

Because of the method of computing currents in the shallow Banks water, the deeper water areas to the east along the slope and below the core of the Labrador Current greatly influence the dynamic height on the Banks. This is the water located between stations 9252 and 9258; 9303 and 9304; 9390 and 9389; on the first, check, and third surveys, respectively, of figure 9A. Between these stations the water shows a definite salinity reduction with time. First, an increase in the amount of water of less than 34.0‰ was observed during the check survey. This is followed by an increase in the amount of water of less than

33.5‰ and the arrival 33.0‰ water found during the third survey. The salinity reduction in this area and on the Banks would cause the calculated elevation of the sea surface as the Banks are approached. In the trough area, the dynamic height change between the first survey, station 9259; and the check survey; station 9305, as shown in figure 8A, is almost negligible. A significant change is detected on the third survey. Examination of the temperature and salinity curves of figure 10A discloses that significant salinity changes were not found in this area until the third survey, when both a reduction in salinity and temperature was observed. Because the trough stations showed little elevation change over the short period between the first and check surveys, it would seem that the flow of the Labrador Current at this time affected or was affected by the characteristics of the Banks and adjacent continental slope water.

### Isobaric Slope

The Labrador Current can be thought of as an edge phenomenon, flowing as the result of steady state requirements of the sea height difference between light, low salinity water on the Grand Banks and slope and the heavier, higher salinity water located off the slope between the Labrador and the Atlantic Current. This edge phenomenon can be observed from the velocity profiles and isotherms for the Labrador Current in section U, figure 11A. It can be seen that the fastest flowing water is not necessarily the coldest, but grades colder and less saline as the Banks are approached. Thus, a wedge of low temperature, low salinity water overrides mixed water of less severe characteristics. Because light-cold water and heavy-warm water are anomalous relationships, it is apparent that salinity controls the density in this current regime.

Figure 8A shows the section U plot of the dynamic heights indicating the gross changes that occurred over the periods between the surveys. Note that only small changes occurred on the Banks between the check survey and the third survey which were separated by more than a month. Observe also the gradual elevation of the trough station during the two periods, leading to the speculation that this mixed water is slowly changing its characteristics as the spring progresses. However, this cannot be conclusively proved because the location of the lowest station, in dynamic height, does not mean that it was

actually situated at the lowest sea surface elevation point. Figure 12A, a T-S plot from stations 9259 and 9388 of the first and third surveys in the mixed water trough shows a density decrease with time above 600 meters, with the reduced salinity causing the density to decrease even under conditions of decreasing temperature at mid-depth.

The changing isobaric slope between the two water masses allows greater or lesser volumes of water to be transported. This slope can be adjusted either by a changing of the dynamic height of the trough (mixed water) or the surface dynamic height on the Banks.

The changes observed between the survey periods leads to the hypothesis that an increase in the dynamic height of the water on the Banks and slope caused a swifter warmer current to flow during the check survey than during the first survey. This increase of the height of the water on the Banks could be caused by the influx of arctic and sub-arctic melt water from the north. It could be assumed here that we were observing cause, adjustment, and affect. This means that the increase in elevation of water on the Banks and slope, with a resulting water volume flow increase, causes entrainment of the existing water in the area. This slope water would then become colder with the arrival from the north of greater volumes of cold water to fulfill the mass continuity requirements being satisfied by entrainment. Alternately, the warmer mean temperatures observed during the check survey could be the result of linearizing the velocity data between stations thus causing an apparent volume flow in warmer water. The small reduction of the volume flow, as seen on the third survey, would result from the greater elevation of the sea surface in the trough area due to the eventual mixing of these more severe water properties as the water transits to the Tail-of-the-Banks and then back up through section U.

### Eastern Banks and Slope Controls

The concepts discussed above are postulated from only three sections and need further work to be completely substantiated; however, the spring freshening of the Grand Banks water is a fact and its influence on the mixed water and the resulting slope of the sea surface between the two water masses is a logical outcome. It is apparent from a further analysis of the data, that the water on the Grand Banks changes as the season progresses and would require some form of ad-



justment and continuity of flow in the current or the mixed water laying further to the east.

Figure 13A is a T-S plot of the more westerly stations on the Banks in 1965. The figure includes north-south lines of the first, check, and third survey stations, and two second survey stations which straddle the northern end of the first and third survey lines. Each station is represented by a point determined from the station's average salinity and average temperature, the use of which are permitted by shallow depth and homogeneity of the water. The stations taken on each of the separate surveys are connected by lines for clarity. Although these stations are not centrally located on the Banks, they are representative of the Banks water slightly modified by the swifter flowing current to the east. The salinity of the water on the Banks during the third survey (stations 9353 to 9403) has been reduced by about 0.2‰ from the first survey (stations 9238 to 9296). As expected, the water is warmer to the south because of warmer air temperatures.

The stations occupied during the second survey, numbers 9342 and 9343, whose locations match stations 9296 of the first survey and 9352 of the third, show that the low salinity water had already arrived at the northern end of the Grand Banks when the second survey was made. On the check survey, the salinities of stations 9301 and 9302 fall nicely between the first and third survey stations of similar location, stations 9255, 9256 and 9373, 9391 respectively. Salinity decreases were observed at both stations while mean temperatures remained about the same. A period of only 9 days separated the check survey stations from the first survey stations, however, the salinities had already lowered by half of the total change found during the third survey, 7 weeks after the first survey.

The above findings tend to indicate that the pronounced water characteristics indigenous to the Labrador Current in the spring, arrive rather abruptly. This is also supported by the volume flow data from the check survey. This is contrary to previous beliefs that gradual temperature and salinity changes take place during the early spring and that the changes which occur in the current system occur over a period of months. Rather, it is apparent that the time scale of change is more on the order of 1 to 2 weeks and perhaps less.

## Circulation Response

The abrupt changes in water characteristics and dynamic heights that occurred on the Banks and slope were in response to the arrival of the colder, less saline water from the north. It is reasonable to conclude that because these changes occur on the Banks and slope first, a certain period of lag is to be expected prior to the arrival of this water in the trough area. The water in the Labrador Current must circuitously flow down toward the Tail-of-the-Banks before its arrival in the trough area. As pointed out above, the dynamic height of the trough area during the three surveys showed a gradual increase in elevation. Figure 8A shows that although an abrupt change had occurred in the dynamic height of the Banks and slope water between the first and the check survey, the trough station on the check survey changed little in dynamic height. Conversely, the Banks station on the third survey changed little from the check survey while the trough station exhibited a considerable change. This leads to the conclusion that the low salinity water observed in the main stream of the Labrador Current during the check survey had not had sufficient time to complete the trip to the trough area and influence the water type there. However, on the third survey significant changes in the water properties above 400 meters occurred. Figure 10A indicates these temperature and salinity changes which occurred in the trough area during the survey intervals. Between the dates of the check survey and the third survey light, low salinity water arrived at the trough. The effect was to raise the elevation of the trough and thus reduce volume flow.

If section U is examined over a year (figure 14A), limited correlation appears to exist between the change in mean salinity of the Banks' water and the volume of water flowing south. An exact correlation cannot be made here because of the influence of temperature on the water's specific volume, the time lag, and unknown mixing proportions which tend to modify the elevation of the water in the trough area. This is evident from the volume reduction that occurred on the third survey even though the Banks station decreased in salinity and had a higher dynamic height. If the check survey had not been conducted, the rapid rise of volume flow would not have been observed and the portion of figure 13A for 1965 would have looked like that for 1964. This kink in the volume flow curve for 1965

tends to indicate that the adjustments were caught prior to any low salinity influence and subsequent elevation of the trough region as observed on the third survey.

Data of the Banks salinity and volume flow from past years, presented in Table IIA, do not show good correlation with the concept of salinity decrease on the Banks and increase in volume flow. These data are from surveys which were separated in time by a month or more and hence cannot be expected to show a correlation due to the lag time between the arrival of the low salinity water on the Banks and the mixing of the water in unknown proportions in the trough area. The only way to observe this postulated salinity decrease and volume increase is to start the survey before the water of lowered salinity completes its swing towards the Tail-of-the-Banks and then north to the trough area. At a current velocity of 1 to 2 knots, less than a week is required. Lateral mixing in section U is held to a minimum because of the steep east-west slope of the  $\sigma_t$  surfaces. This will be discussed in further detail in the section on isentropic analysis. As the current passes the trough area, some alteration of the properties take place in the trough; however, the greatest changes occur while the water completes its trip from north to south and then north to the trough region. Data of previous years do not provide any means for determining short-term volume flow tendencies or the rate of change of the salinity of the Banks water. The significant flow changes observed during 1965 were the result of closely timed, repeated sections.

### Future Work

A greater understanding of the salinity-volume flow relationships would enable a temperature-salinity monitoring system on the Banks to indicate salinity reduction and volume changes occurring to the Labrador Current. These could have implications in iceberg drift prediction.

Weekly fluctuations of the Labrador Current might be superimposed on seasonal variations which would tend to alias the data collected at monthly intervals thus rendering year to year comparisons misleading. Attempts will be made during the spring of 1966 to more accurately define the flow changes and to determine whether or not these changes are of a short- or long-term duration.

## ISENTROPIC ANALYSIS

### Basic Concepts

A method of observing water movements and changes in property distribution for comparison with dynamic heights is desired. It would be advantageous to have such a comparison in the hope of verifying and eliminating ambiguities in dynamic height contour charts. Isentropic analysis provides this independent method for determining water movement. Rossby et al. (1937) pioneered isentropic analysis of the atmosphere. They showed that atmospheric specific humidity proved valuable for observing the distribution of identifying properties on surfaces of equal density. Parr (1938a) and Montgomery (1938) applied a similar technique to the oceans and found it extremely useful in tracing water mass source and movements. Parr (1938a) made direct comparisons of isentropic charts with Ice Patrol dynamic height charts and indicated that true water movements at the southern end of the Grand Banks, Newfoundland, could better be deduced from the analysis of water circulation on density surfaces. Montgomery (1938) extended his analysis to water movements of the upper layers of the southern North Atlantic Ocean and deduced source locations of the various density layers.

The implementation of isentropic analysis calls for the determination of the surfaces of constant entropy. According to Montgomery (1938), this surface is best approximated by the surface of constant potential density which at pressures of less than 1,000 decibars is equivalent to surfaces of equal  $\sigma_t$ . This approximation is necessary because no surfaces exist in the ocean along which the mixing of water masses can take place without altering the mass distribution and therefore the entropy or energy level of the system.

A  $\sigma_t$  or quasi-isentropic surface presentation is useful because flow patterns on these surfaces represent the nearest approach to the true conditions of movement. In addition, the currents tend to flow parallel to the contour lines of the  $\sigma_t$  surface therefore providing information on the direction of movement. These are axiomatic truths because of the hydrodynamic fact that flow will take place along levels of equal density unless active mixing alters the energy levels. Some departure will take place because of the effect known as cabbeling<sup>1</sup> where water

<sup>1</sup> Smith (1931) describes this phenomena. Von Arx (1962) refers to it as caballing.



mixed on a sigma-t surface will seek a slightly deeper density surface.

It is emphasized here that the basis of isentropic analysis is the deduction of flow patterns from the distribution of dissolved substances which are independent of the density determinations. Furthermore, flow patterns are independent of the assumptions for geostrophic movement and hence can verify or disclose any deviations from computed gradient flow. Oxygen and other chemical properties, due to their independence from density computations are ideal flow indicators on the density surfaces when due consideration is given to biological changes. However since these values are not always available, either temperature or salinity may be used. Parr (1938b) favored temperature because he felt the interpolated values are more certain than those of salinity. Montgomery (1938) on the other hand takes the view that salinity is superior due to the strong vertical temperature gradients and the actual temperature on the sigma-t surface would not be representative. For Ice Patrol requirements, the wide range of temperature compared to the accuracy of determination provides for very great property variation on the sigma-t surface which is the best definitive characteristic of the current system. It would be redundant to contour both temperature and salinity since they are used to define the sigma-t surface initially.

### Chart Preparation

Charts of the temperature distribution on selected sigma-t surfaces in the Grand Banks area during the first and third surveys, were prepared from the plots of temperature versus sigma-t at each station. These are shown in figures 15A to 23A. The depth of the surface at each station has been indicated and a comparison with the surface dynamic height contours may be made with figures 2A and 5A. On each chart, the intersection of the sigma-t surface with the sea surface is shown as a broken line and, when it occurs, the intersection with the bottom as a dashed line.

### Chart Analysis

An examination of the isentropic charts, figures 15A to 17A, reveals that the distribution of the 1° C. isotherm clearly delineates the boundary of the Labrador Current. A comparison with the 25 and 50 meter horizontal isotherm charts of figures 24A and 25A for the same survey shows that the horizontal isotherm charts do not clearly

display the water tongues characteristic of the Labrador cold core. However on the sigma-t surface charts the tongues of water are very nicely demarked, therefore, several levels were prepared for analysis of the water movement.

The sigma-t surfaces of 26.7, 26.8, and 27.0, figures 15A to 17A, from the first survey show a severe downward slope towards the Banks. This slope would tend to reduce or even eliminate horizontal mixing because a crossing of strong horizontal density gradients would be required. The third survey isentropic charts, figures 18A to 20A, show a definite leveling of these surfaces and a slight increase in depth. This is probably due to the greater volumes of lighter water in the area since a 26.6 surface can be drawn for the third survey, whereas, on the first survey, water of a sigma-t of 26.7 was the lightest water present in abundance. If a comparison is made between the isotherm charts, plotted on the 25- and 50-meter levels for the first survey, and the isentropic temperature distribution charts, definite differences can be seen. As pointed out above, the tongues of water cannot be observed on the constant depth charts, figures 24A and 25A, even though these levels are in the depth range of the sigma-t charts which clearly describe the boundaries of the temperature tongues. This is apparently because these tongues of water are moving along steeply sloped surfaces and horizontal slices at specific levels fail to capture them. A comparison at the third survey sigma-t charts and the horizontal presentation at 75 meters, figures 18A to 23A and 26A show that the isotherms appear quite similar in their distribution on both types of presentation. Horizontal mixing can now take place due to the lessened horizontal gradient and the tongue like property distribution is destroyed as the Labrador Current flows south. Both presentations of the third survey are similar with the water grading from cold to warm toward the east as the influence of the Atlantic Current begins to dominate the temperature distribution. This greater horizontal mixing is obvious from the north-south temperature distribution of the Labrador where the third survey shows the arrival of colder water at the head of the system than found on the first survey. In addition, this colder water appears to be warmed faster as it travels south thus indicating more active mixing is taking place with the warmer Atlantic Current.

The unique display of tongues of cold water on the sigma-t surfaces leads to the question as to



what is actually being observed. From the volume flow calculations, the flow during the first survey is minimal. This leads to the postulation that late winter steady state conditions are described. That is to say that the cold water input at the head of the system is being advected south and warmed sufficiently such that steady conditions of the conveyor belt form exist. On the other hand, the beginning of cold water intrusion into a background of existing winter water conditions might be a better conclusion.

The arguments for steady state are few indeed since 1 week after the first survey, a vast increase of water along with profound property changes occurred in the Labrador Current. If steady state conditions existed on the first survey, great mixing would be required to warm the prow of cold water moving south. The warming would result from the warmer water on all sides of the tongue including in front of the intruding prow. The anomalous point is that the salinity along the core of the Labrador during the first survey grades lower to the south. This was quite different from the expected situation of the Labrador Current grading more saline to the south. Figures 27A and 28A are plots of salinity at the center stations along the Labrador Current during the first and third surveys. It shows that the salinity graded lower from north to south during the first survey and then higher from north to south on the third survey. The lateral salt distribution grades higher to the east and slightly less to the west. On the Banks the salinity grades higher to the south during the first survey, as expected. If mixing and warming are occurring with resulting steady state conditions as envisioned above, then the contribution from the east would cause higher salinities as the water moved south rather than the lower salinities actually observed. Water from the west would tend to lower the salinity slightly, but this effect would be masked by the much greater salt content of the water from the east. A more reasonable explanation is that we are observing the intrusion of new water from the north, the initial arrival of more severe properties resulting from the spring freshening of the Labrador Current.

The higher salinity to the north observed on the first survey can be attributed to the winter increase in salinity and off-shore mixing further north due to a reduced flow rate. This would not be observed later in the season because of the increased flow and contribution of sea ice melt

water. In this situation the intruding cold water could account for the great slopes of the sigma-t surfaces which would also tend to isolate these tongues from any lateral influence. This colder water mass seems to be invading a more uniform environment and a leveling adjustment towards some form of equilibrium has not had time to take place. Horizontal mixing, across sigma-t surfaces, would be minimal initially, but would eventually become dominate and alter the property distribution to that found on the third survey. This theory is also compatible with the great freshening of flow observed only 1 week after the first survey. Water velocities of only 0.5 knots would be required to move the intruding cold water from the north, found on the first survey, down to section U of the check survey. Velocities of this magnitude were found in the Labrador Current during the first and check survey periods. It could also be expected that some indication of a change of this magnitude would be observed in the first survey results. Again a relation is seen with the speculation from the previous section in that there is a salinity flow control on the Banks and slope and that this initial flow is tied in with new water arriving on the Banks and slope. This causes a change in the dynamics of the regime and requires a supply of water to fill the continuity conditions of flow, thus explaining the warmer temperatures observed during the check survey of section U where warmer water is drawn in to meet increased mass continuity requirements.

Some surface influence is also shown in the sigma-t presentation. This is indicated by the crowding of the isotherms as the sigma-t surface approached the sea surface and is particularly apparent in the southeastern regions of the Banks nearer to the Atlantic Current. Montgomery (1938) cited the sea surface intersection with the sigma-t surfaces as the formation region of the water found on or slightly below the particular intersecting sigma-t surface. No doubt some surface mixing and sinking is taking place, however, the water on the sigma-t surfaces flowing along the Banks' slope has its source outside of the immediate area of interest.

### Isentropic and Geostrophic Comparison

The fact that these isentropic presentations disclose flow tendencies independent of geostrophic computations provides a useful tool for comparison with the dynamic calculations. Certain areas of uncertainty in the calculated surface circulation

can be substantiated or altered based on the isentropic flow patterns. Parr (1938b) objected to some interpretations, on the part of Ice Patrol, of the dynamic height charts used for iceberg drift predictions. Parr's isentropic analysis near the southern end of the Banks tended to show a large pooling tendency which was not shown on the dynamic charts. This pool is now generally accepted as a quasi-fixed feature. Parr's work did show that better water movement information could be obtained from isentropic analysis, however the discrepancies that he found were much greater than can be discovered using present day data collection techniques. Prior to World War II the sparseness of station data coupled with technique differences probably accounted for a weakness in the dynamic height charts.

Good comparisons can be seen between the circulation deduced from the isentropic charts and the dynamic height charts shown in figures 2A and 5A. Where the dynamic height charts present quantitative current information, future changes are reflected in the isentropic charts. Figures 15A to 18A indicate that cold water was entering the system during the first survey, and ultimately was seen to have a definite circulation effect based on data obtained on the check survey conducted only 8 days later. This cold water intrusion from the north is not indicated in the dynamic height charts. Basically, the direction of flow of the dynamic height and the isentropic charts match very nicely in all areas. Figure 2A, shows an area of uncertainty, indicated by dotted streamline, in the northwest section current pattern deduced by dynamic heights, however, the sigma-t surface of 26.7, figure 15A, distinctly shows the water flowing onto the Banks in that area. A cyclonic flow pattern is defined by the dynamic height streamlines based on third survey data, figure 5A, in the southeast quadrant of the survey area. A look at the isentropic charts substantiates this circulation. Several sigma-t levels definitely show the cyclonic circulation with water of low temperature and low salinity entering from the east. This is incongruous with the water types usually found in the Atlantic Current and it can be concluded that this is a closed cell which probably had its origin from the cold water pool normally found at the Tail-of-the-Banks as shown in figure 2A. Looking at the 26.6  $\sigma_t$  level, figure 18A, the cell appears separate from the general near surface flow. On this level, water of 11.0° C. enters from the east which is anomalously warm and is

probably near surface water being entrained from the warmer layers of the Atlantic Current.

At the 26.8- $\sigma_t$  level, figure 19A, the cell remains quite warm and shallow and affected by the warmer surface water movements. A slight indication of upwelling is seen now from the temperature lowering near the center of this cyclonic circulation with warmer water at the periphery being drawn around the eddy.

The 27.0- $\sigma_t$  level, figure 20A, reflects active upwelling in the eddy center not only by colder temperatures, but also by a definite dome in the depth of the sigma-t surface. Warmer water of the Atlantic Current appears to be moving anticyclonically around the eddy in a northwesterly direction. Although it is not shown in these illustrations, the data indicates not only a cooling of the eddy waters but also a reduction in salinity. On this level, the coldest water appears to be displaced slightly to the north from the 26.8- $\sigma_t$  level. The 27.2- $\sigma_t$  level, figure 21A, is inconclusive as to whether or not a circulation connection exists with the northwest meander of the Atlantic Current cited above. In this situation the eddy does not appear to be closed. Although isotherm contours do not indicate the circulation in the case of the 27.4- $\sigma_t$  and 27.6- $\sigma_t$  levels, figures 22A and 23A, the topography of the sigma-t surfaces again show that the cyclonic circulation seems to be causing some upward movement of the water in the eddy.

In conclusion, it has been shown that isentropic analysis is an excellent tool for depicting details of the circulation in the vicinity of the Grand Banks. The presentations would be more accurate if a nondensity related property such as oxygen was used. For Ice Patrol current prediction procedures, it appears that detailed analysis of this nature is not warranted in all areas on a routine basis, however, to completely define and predict the Labrador's variation, the cold water core should be examined with this method. Because the water moves along sigma-t surfaces, the intrusive flow of the Labrador Current water is clearly shown by the isotherms in contrast to the rather nondescript presentation of the horizontal levels. The method is probably most valuable for observing the trend of future conditions, since water masses of differing characteristics which ultimately influence the entire area can frequently be traced from their point of original entry.

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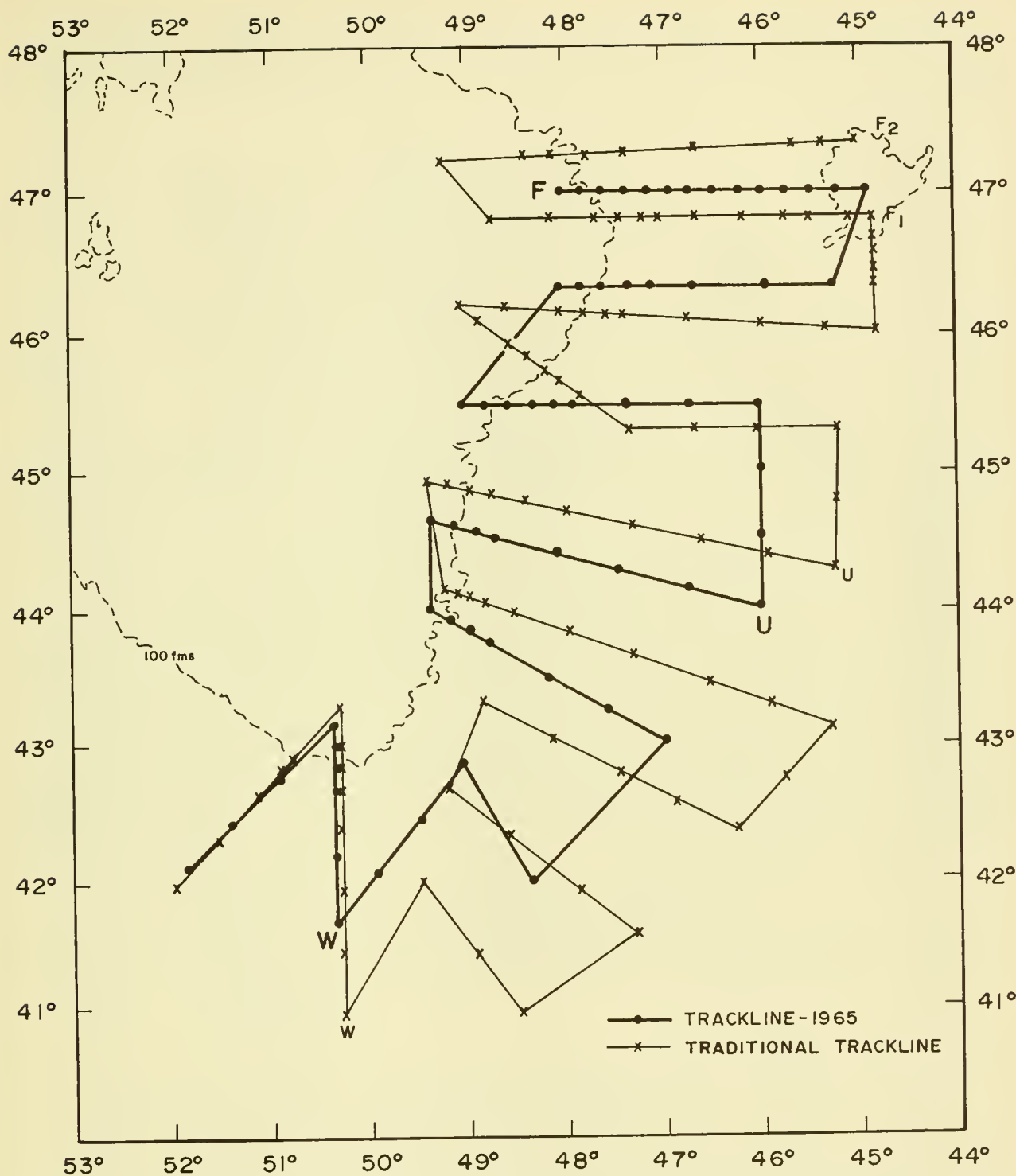


Figure 1A. Trackline and station array of past Ice Patrol seasons compared with the 1965 Ice Patrol season. Section letter designations are shown.



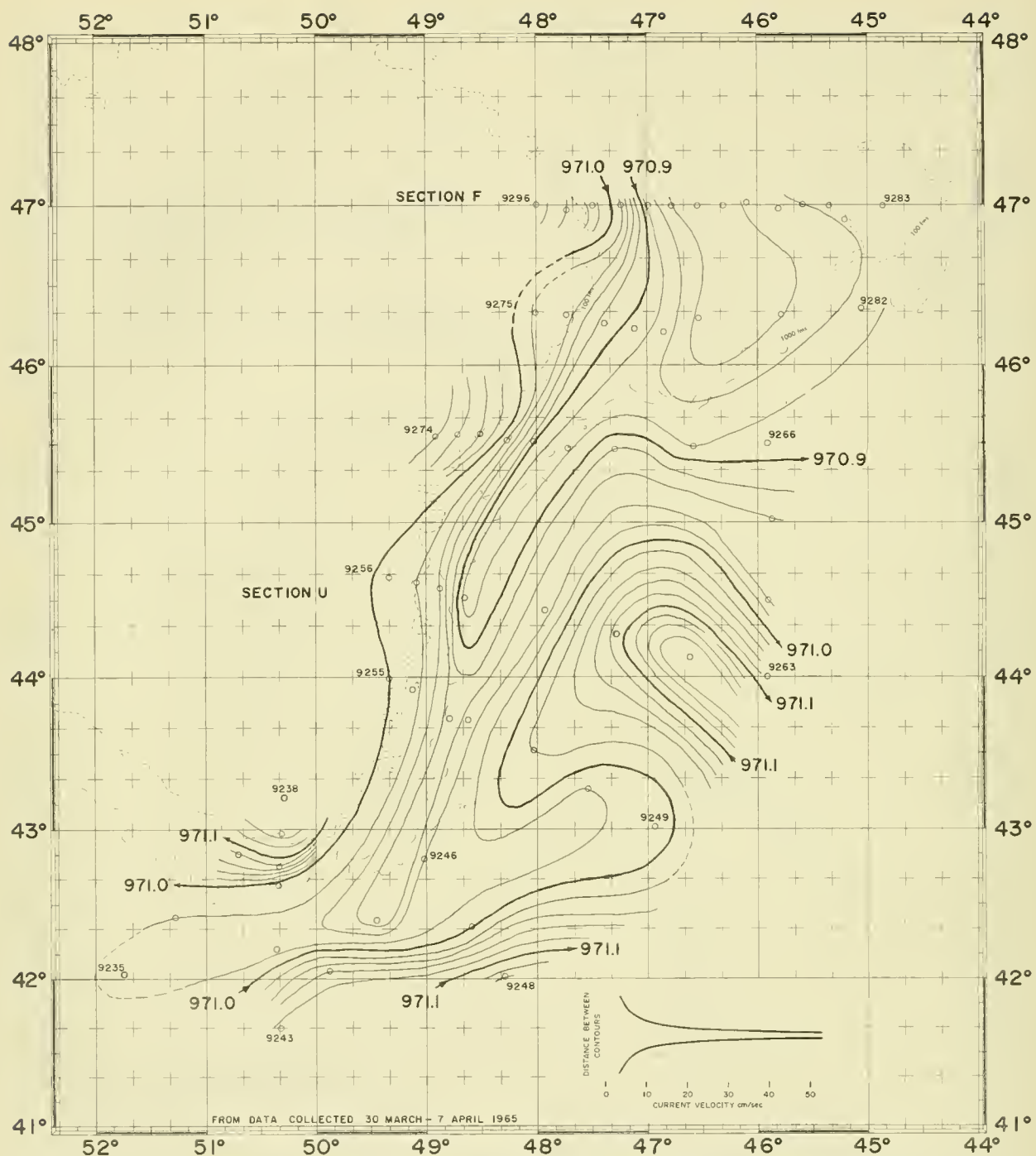


Figure 2A. Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected during the first survey 30 March-7 April 1965. Oceanographic station positions are indicated and the station numbers given at turning points.



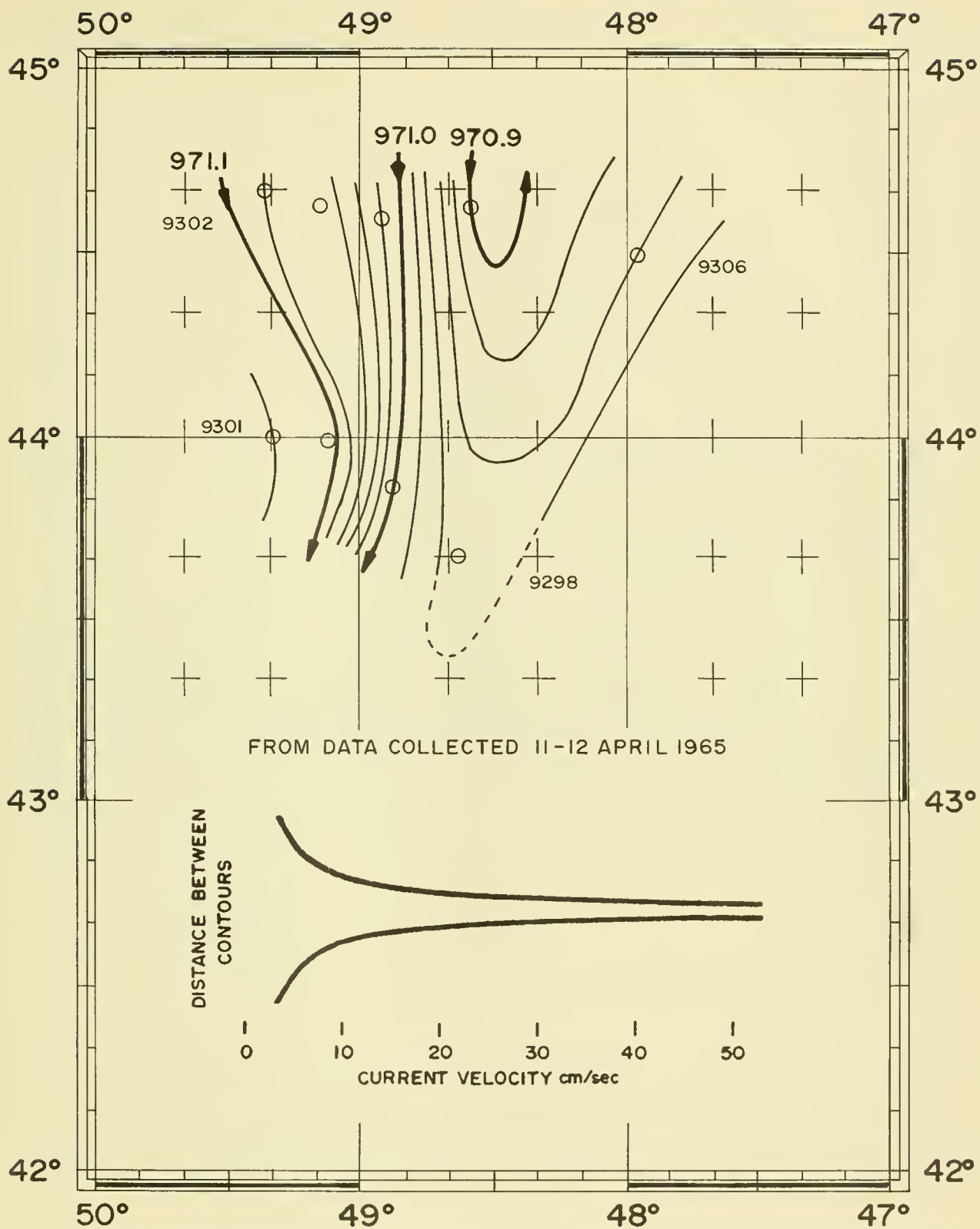


Figure 3A. Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected during the check survey 11-12 April 1965. Oceanographic station positions are indicated and the station numbers given at turning points.

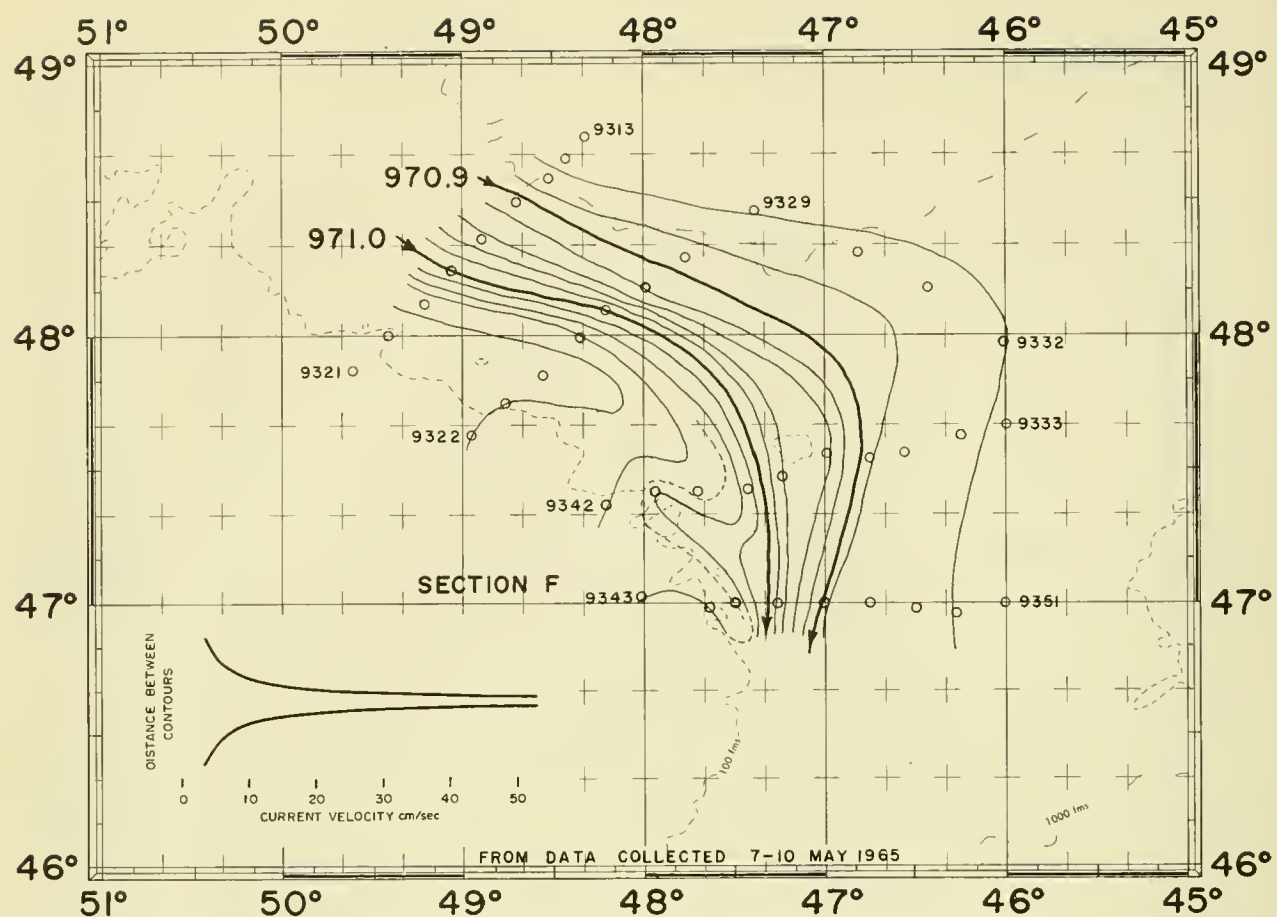


Figure 4A. Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected during the second survey 7-10 May 1965. Oceanographic station positions are indicated and the station numbers given at turning points.

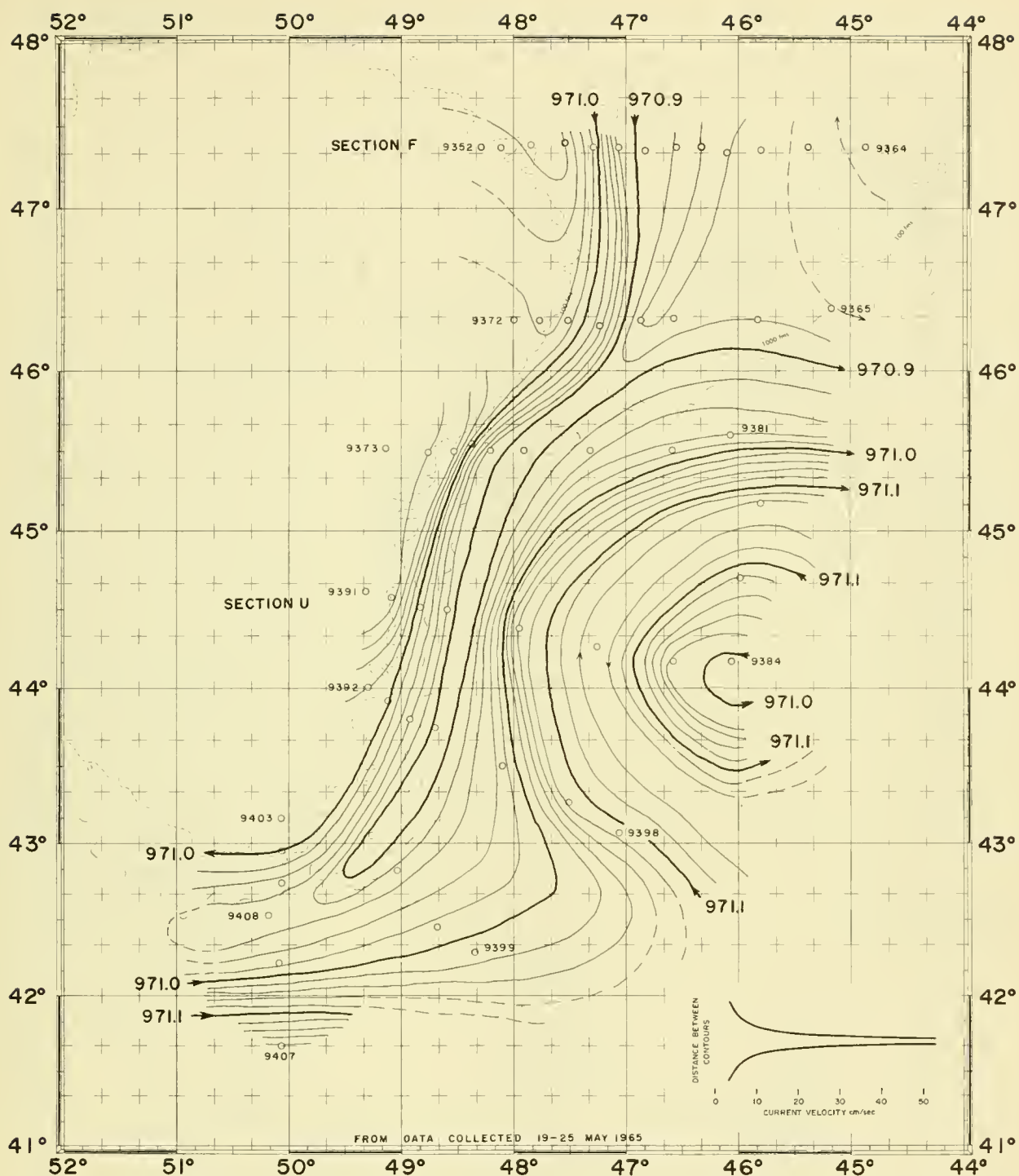


Figure 5A. Dynamic topography of the sea surface relative to the 1,000-decibar surface, from data collected during the third survey 19-25 May 1965. Oceanographic station positions are indicated and the station numbers given at turning points.

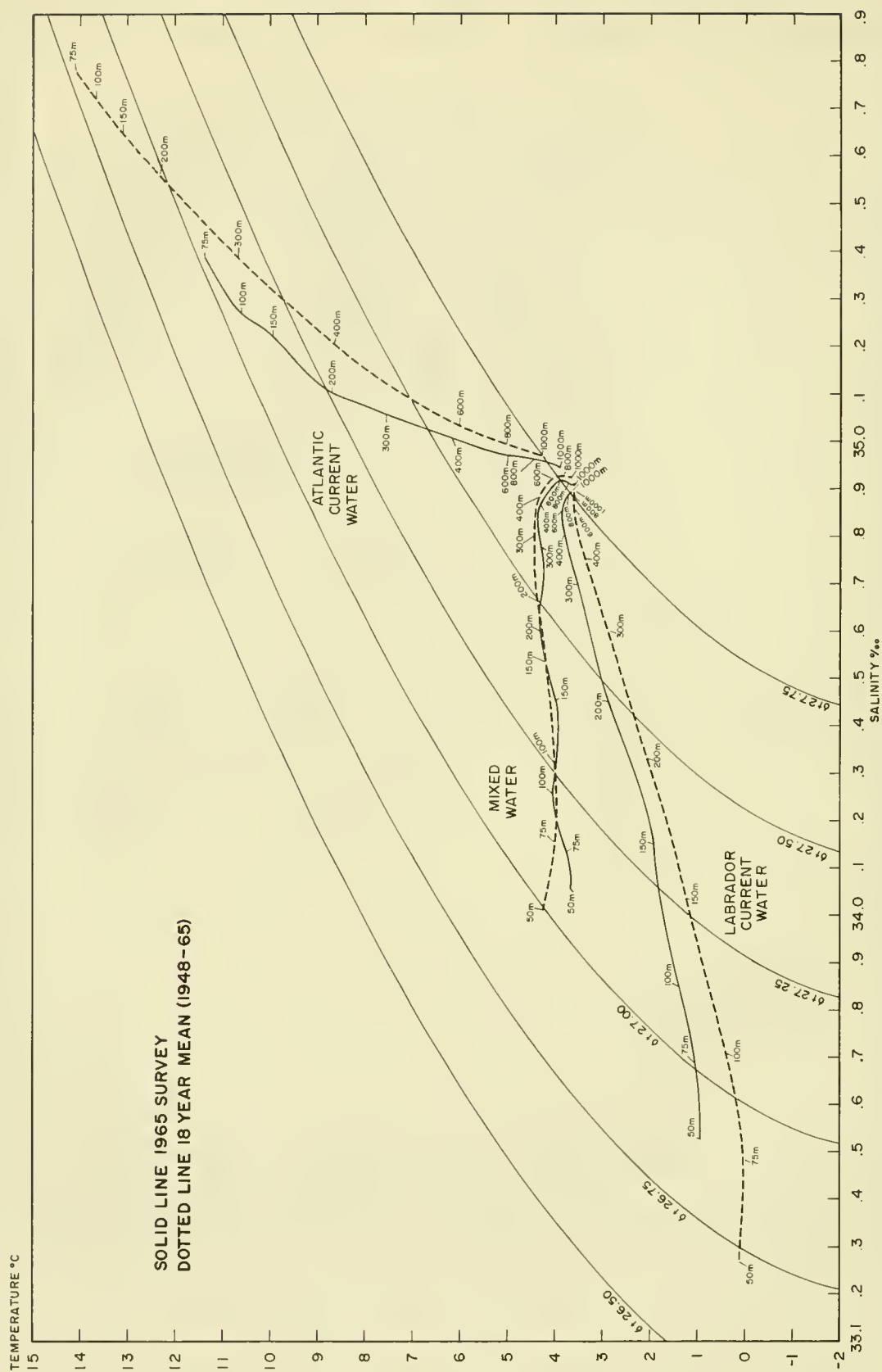


Figure 6A. Mean temperature-salinity relationships for Labrador Current Water, Atlantic Current Water, and Mixed Water found in the Grand Banks region. Solid lines show conditions found during 1965 and broken lines represent the 18-year mean.

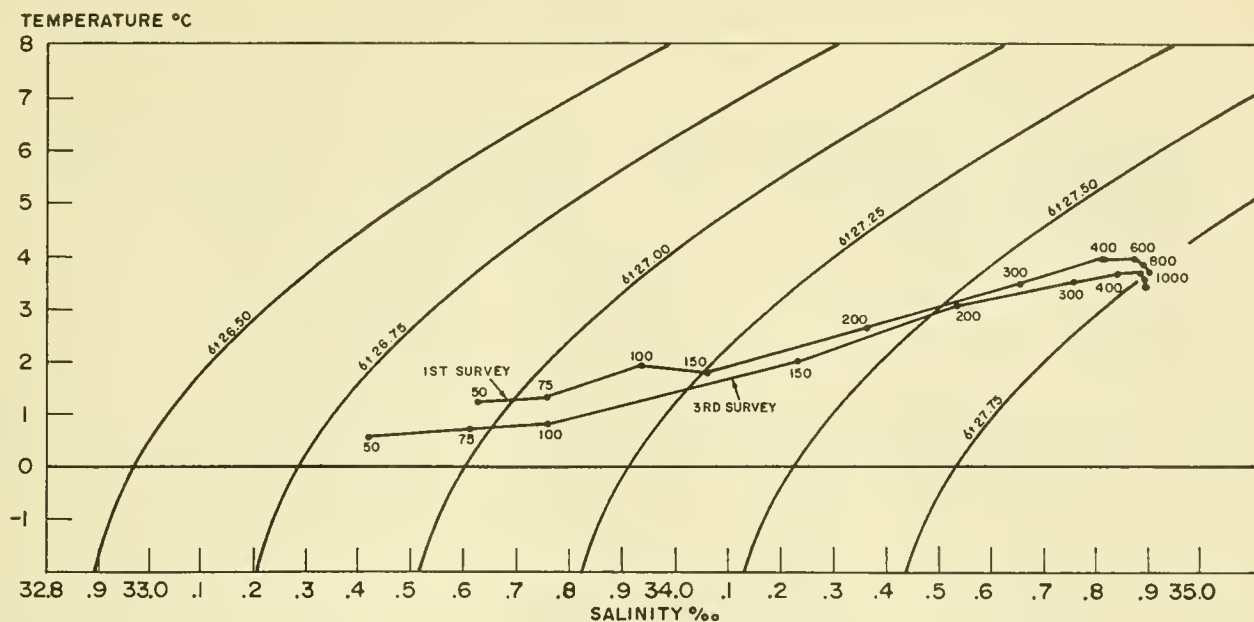


Figure 7A. Mean temperature-salinity plot of all stations on the first and third surveys situated in the Labrador Current during 1965.

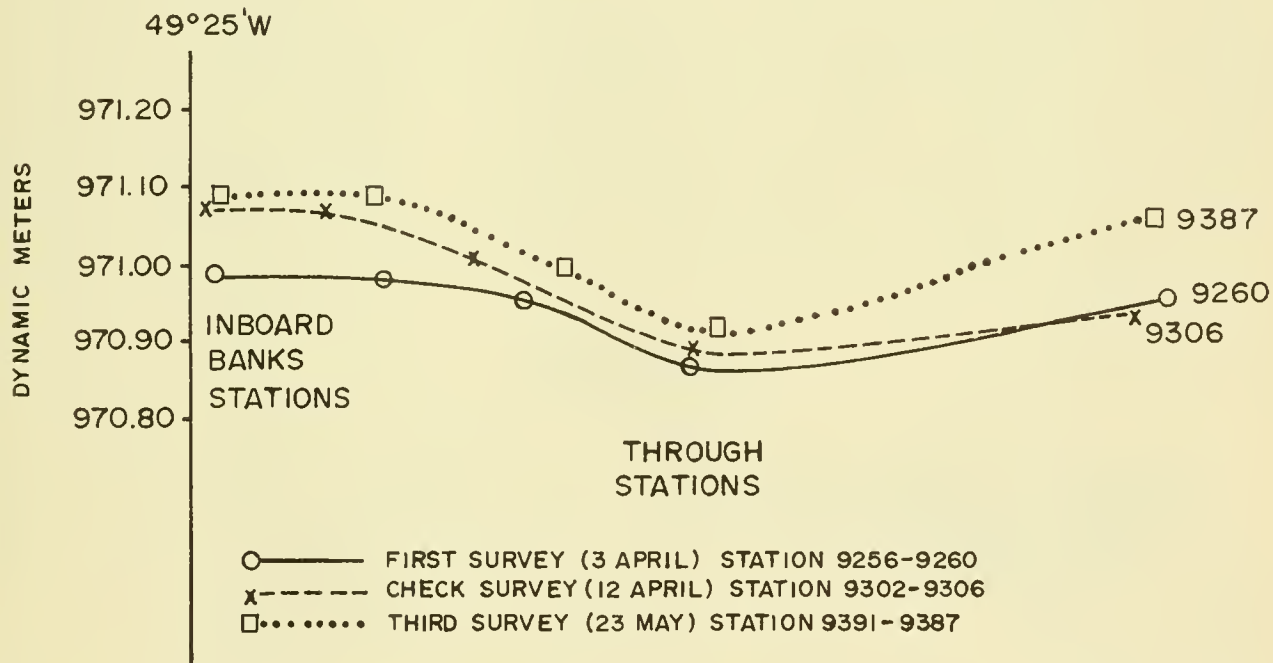
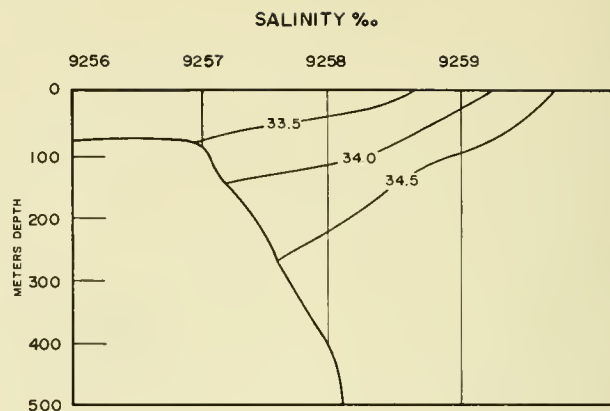
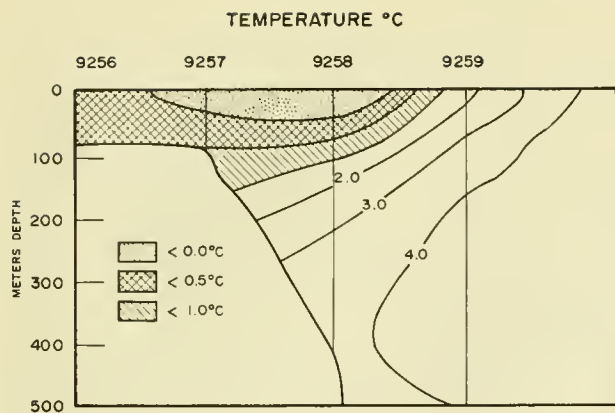
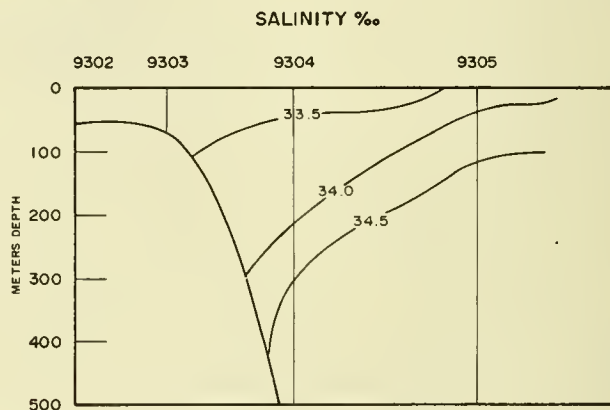
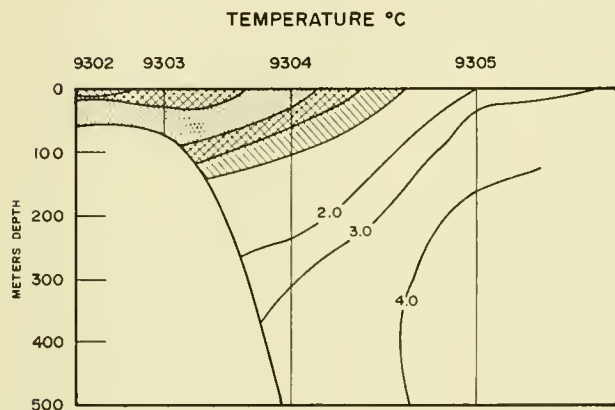


Figure 8A. Surface dynamic heights in dynamic meters along section U for the first, check, and third Ice Patrol surveys 1965.

## FIRST SURVEY



## CHECK SURVEY



## THIRD SURVEY

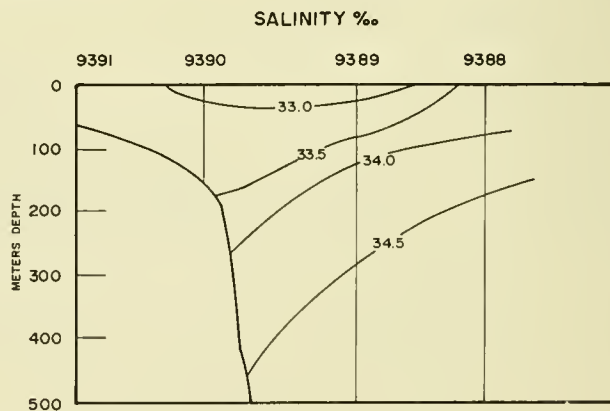
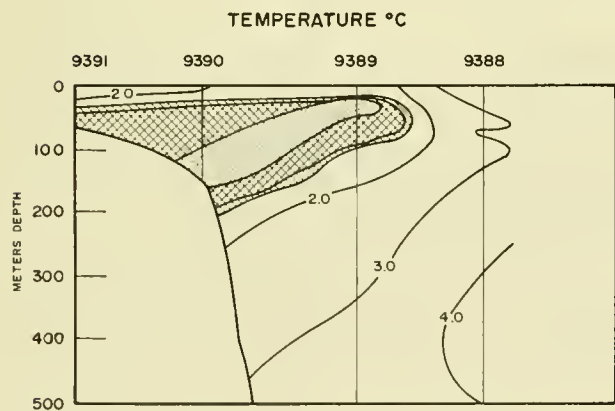


Figure 9A. Temperature and salinity distribution along section U for the first, check and third Ice Patrol surveys 1965.



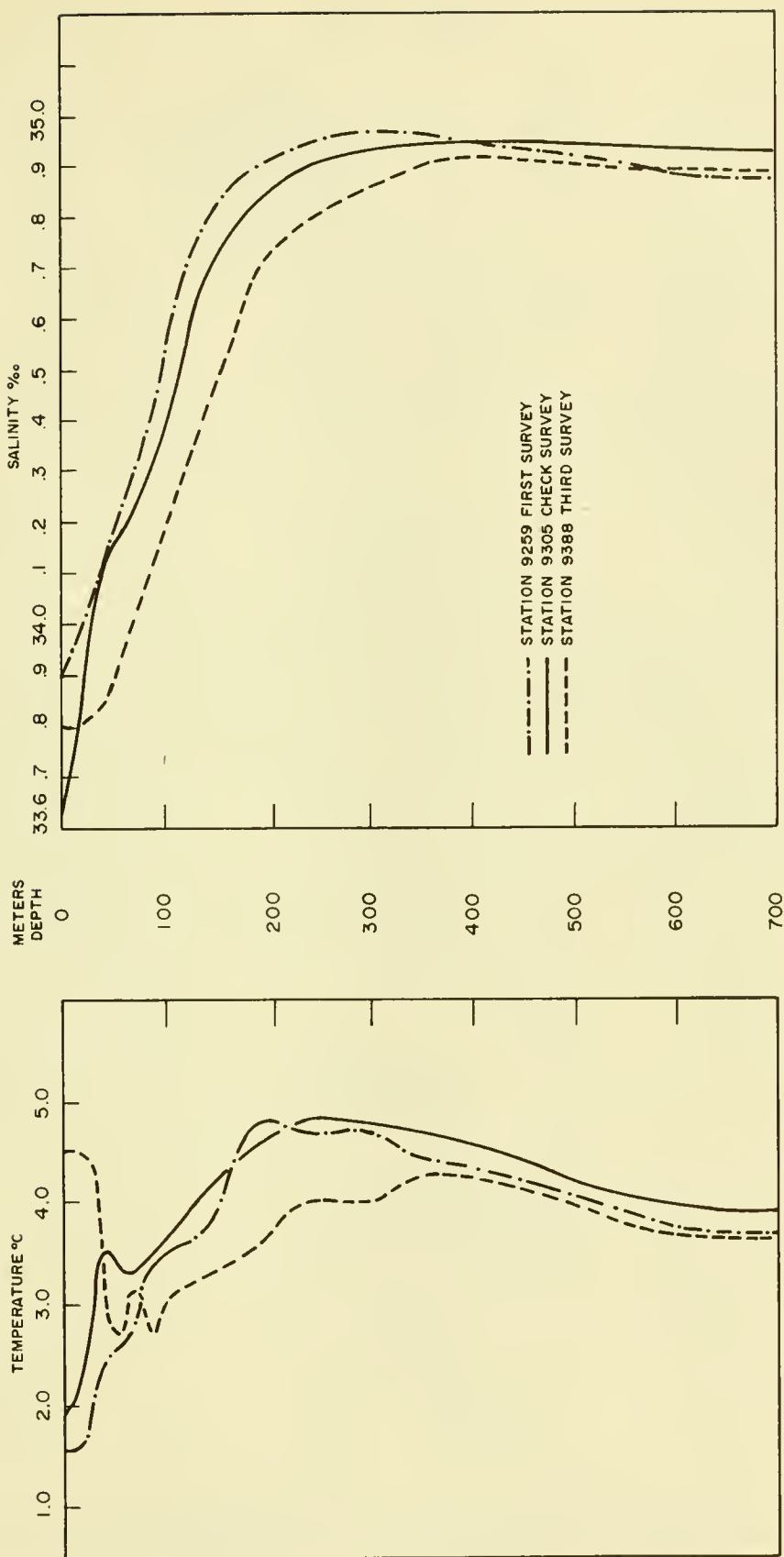
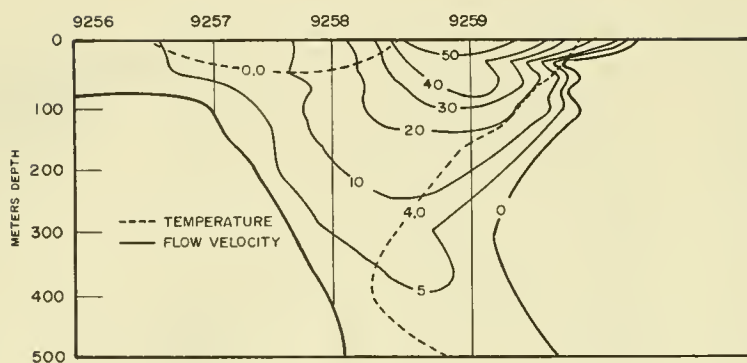


Figure 10A. Vertical distribution of temperature and salinity in the dynamic topography trough area of section U of the first, check and third Ice Patrol surveys 1965.

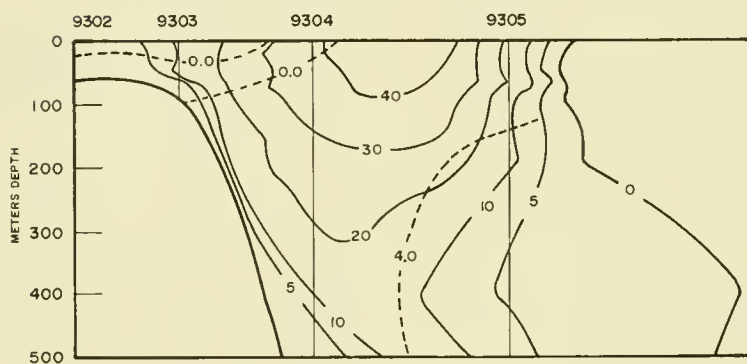
## FIRST SURVEY

TEMPERATURE °C AND FLOW VELOCITY cm/sec



## CHECK SURVEY

TEMPERATURE °C AND FLOW VELOCITY cm/sec



## THIRD SURVEY

TEMPERATURE °C AND FLOW VELOCITY cm/sec

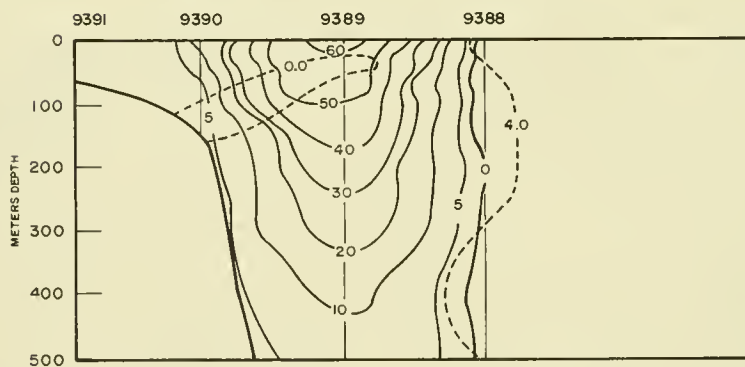


Figure 11A. Velocity distribution along section U for the first, check and third Ice Patrol surveys 1965. The 0.0° C. and 4.0° C. isotherms are indicated by dashed lines.

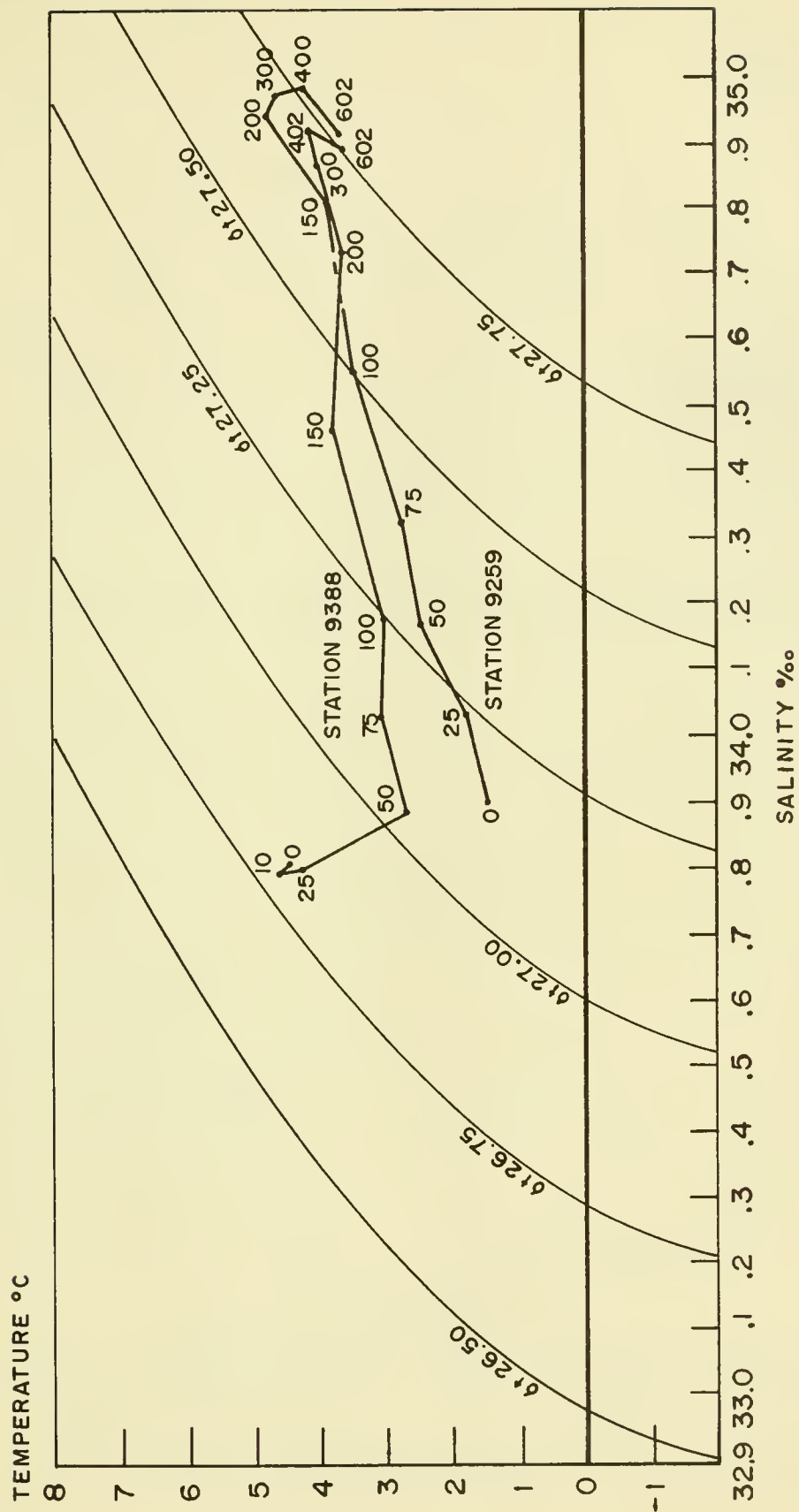


Figure 12A. Temperature-salinity plot of stations 9259 and 9388 located in the dynamic height trough area of section U of the first and third Ice Patrol surveys 1965.

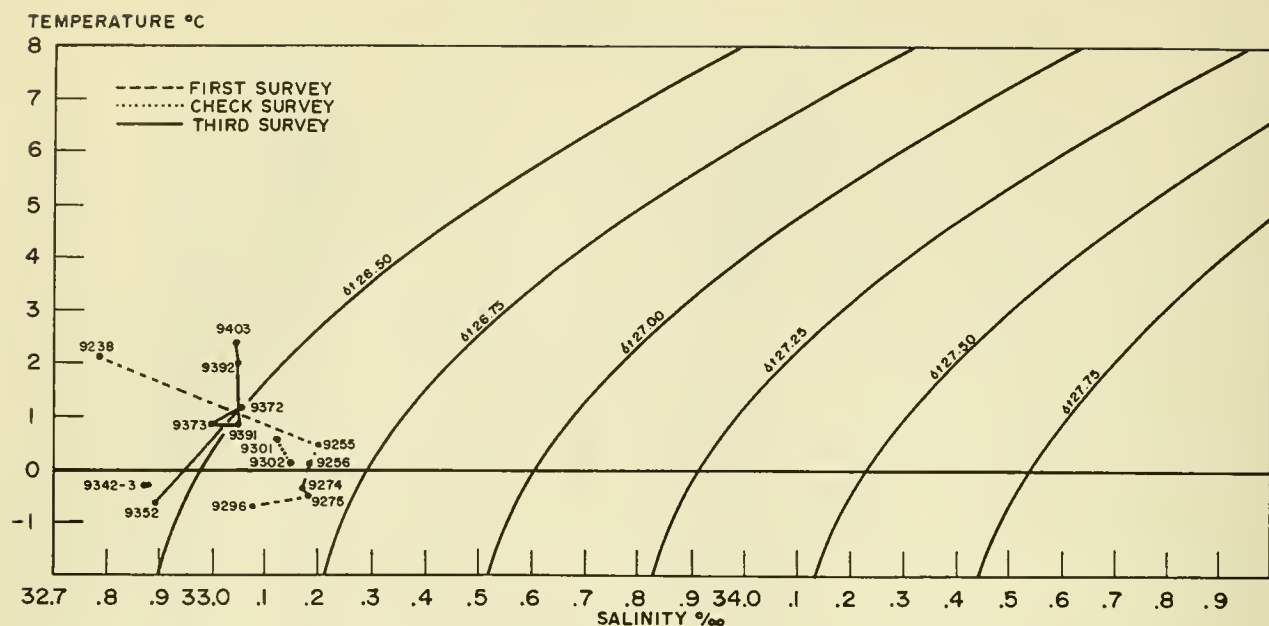


Figure 13A. Mean temperature-salinity plots, averaged over total depth, of the most westerly stations on the Grand Banks of Newfoundland for the first, check, second and third Ice Patrol surveys 1965. Stations 9342 and 9343 from the second survey are shown as almost coincident points.

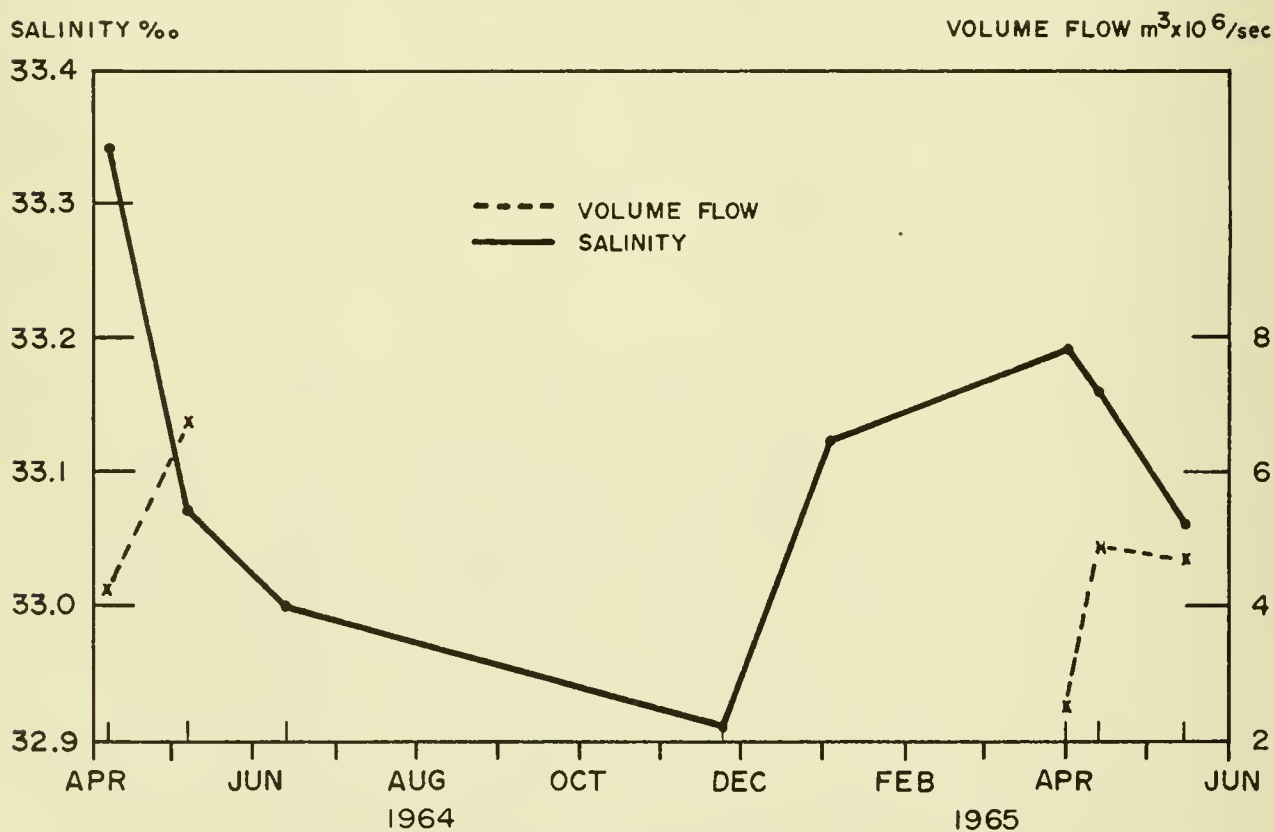


Figure 14A. Variation of volume flow through section U and the change in salinity of the water on the Grand Banks during 1964-65.



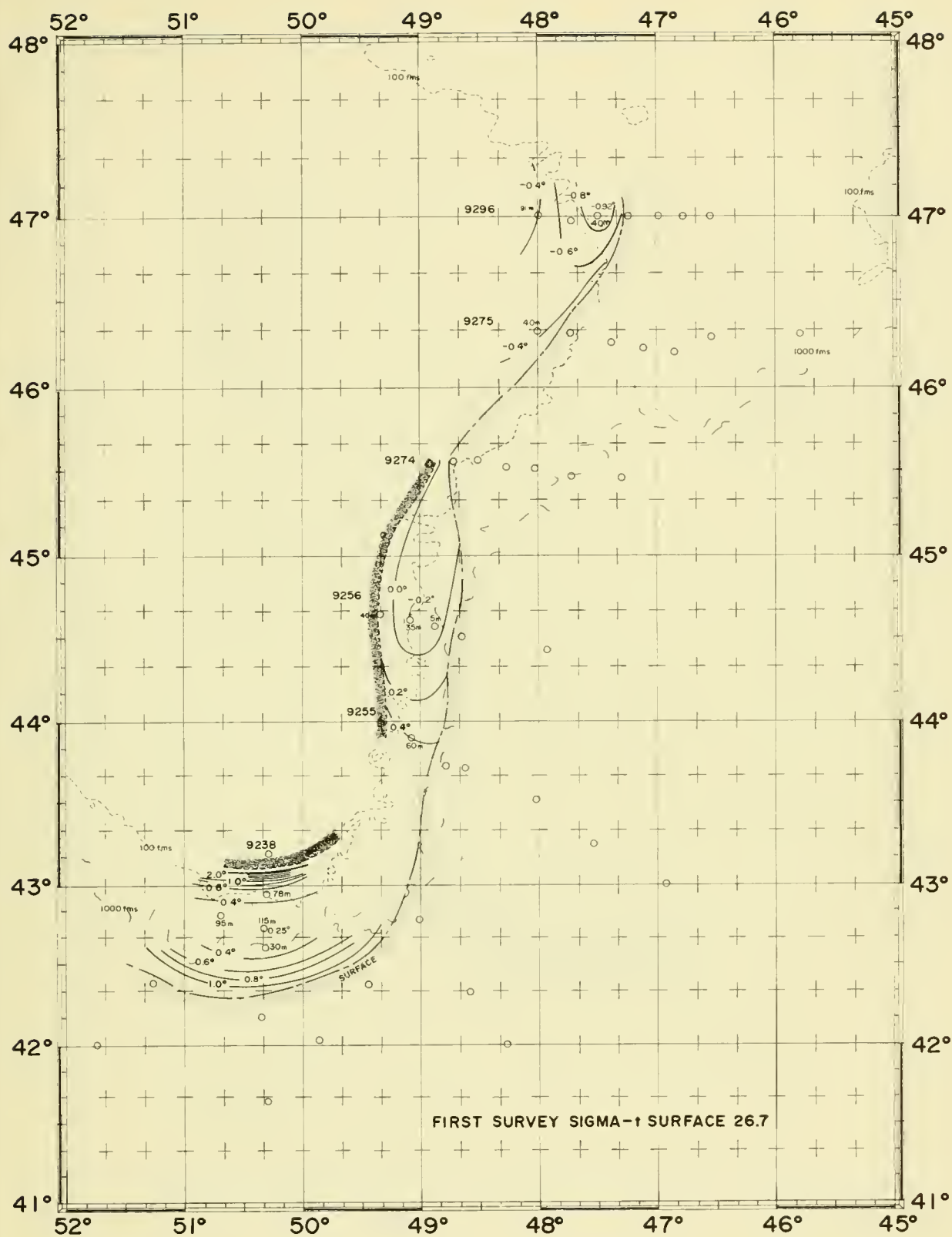


Figure 15A. Sigma-t level, 26.7, showing isotherm contours and sigma-t surface intersections with the bottom and sea surface. Based on data collected during the first survey of Ice Patrol 1965.



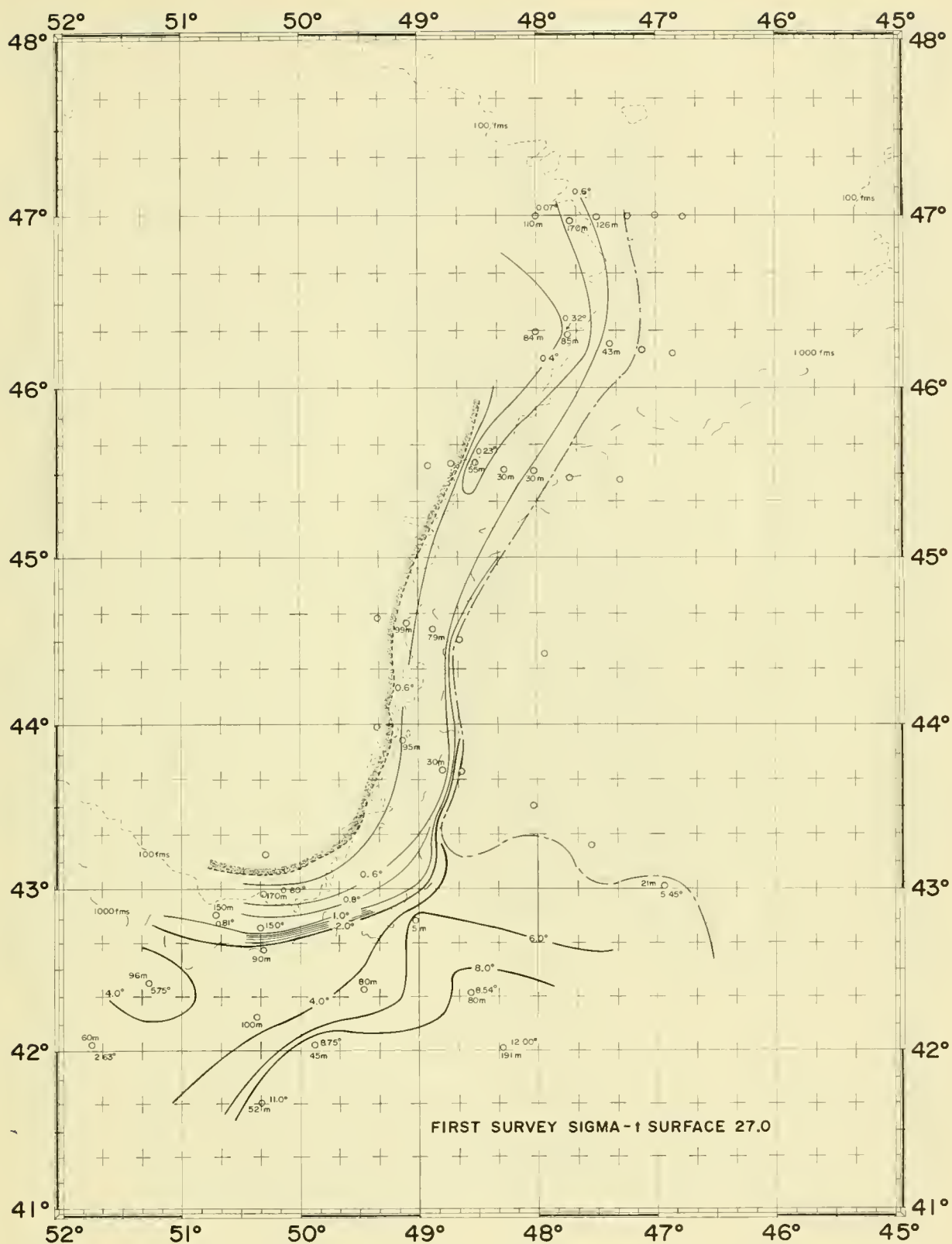


Figure 17A. Sigma-t level, 27.0, showing isotherm contours and sigma-t surface intersections with the bottom and sea surface. Based on data collected during the first survey of Ice Patrol 1965.

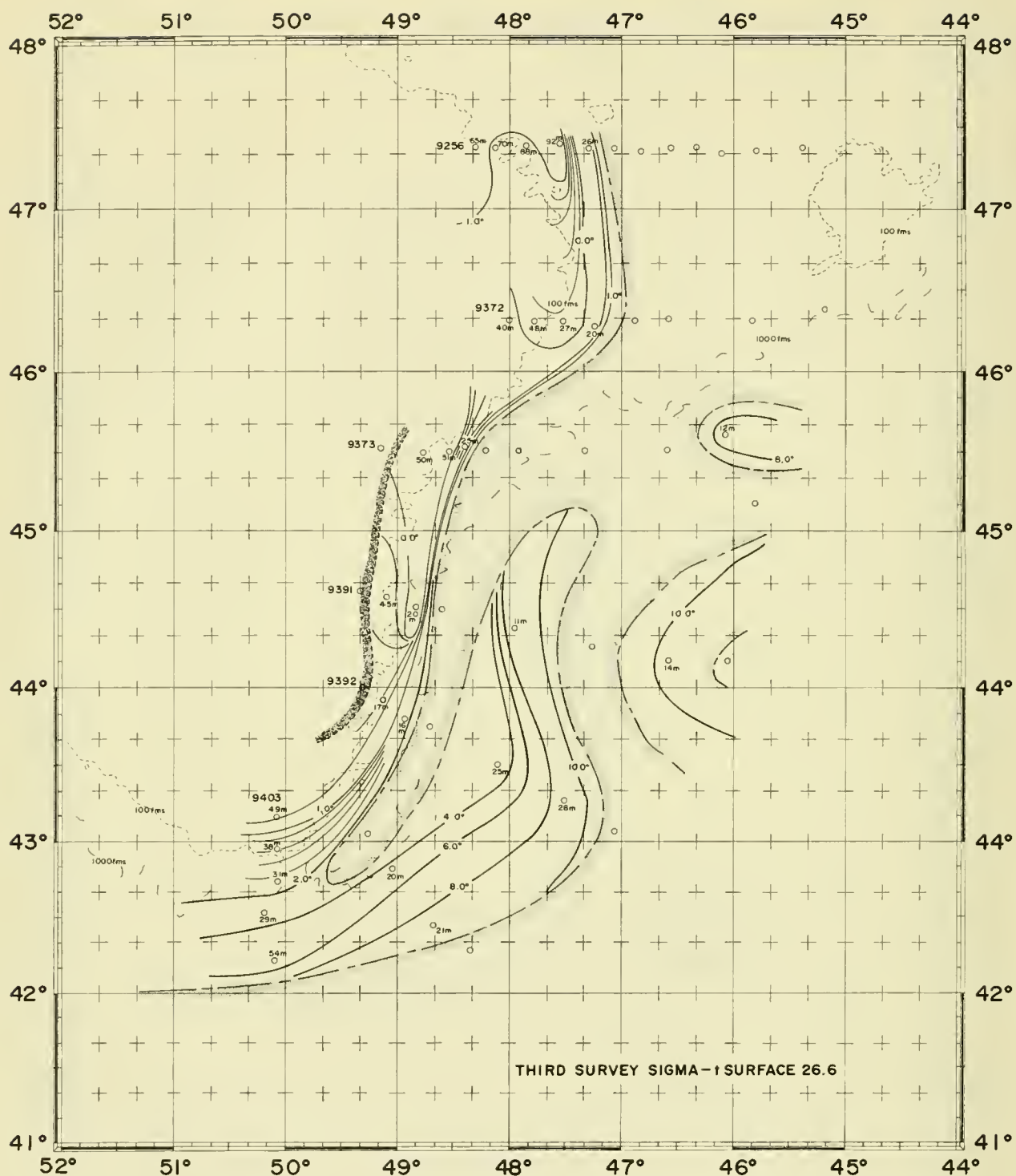


Figure 18A. Sigma-t level, 26.6, showing isotherm contours and sigma-t surface intersections with the bottom and sea surface. Based on data collected during the third survey of the Ice Patrol 1965.





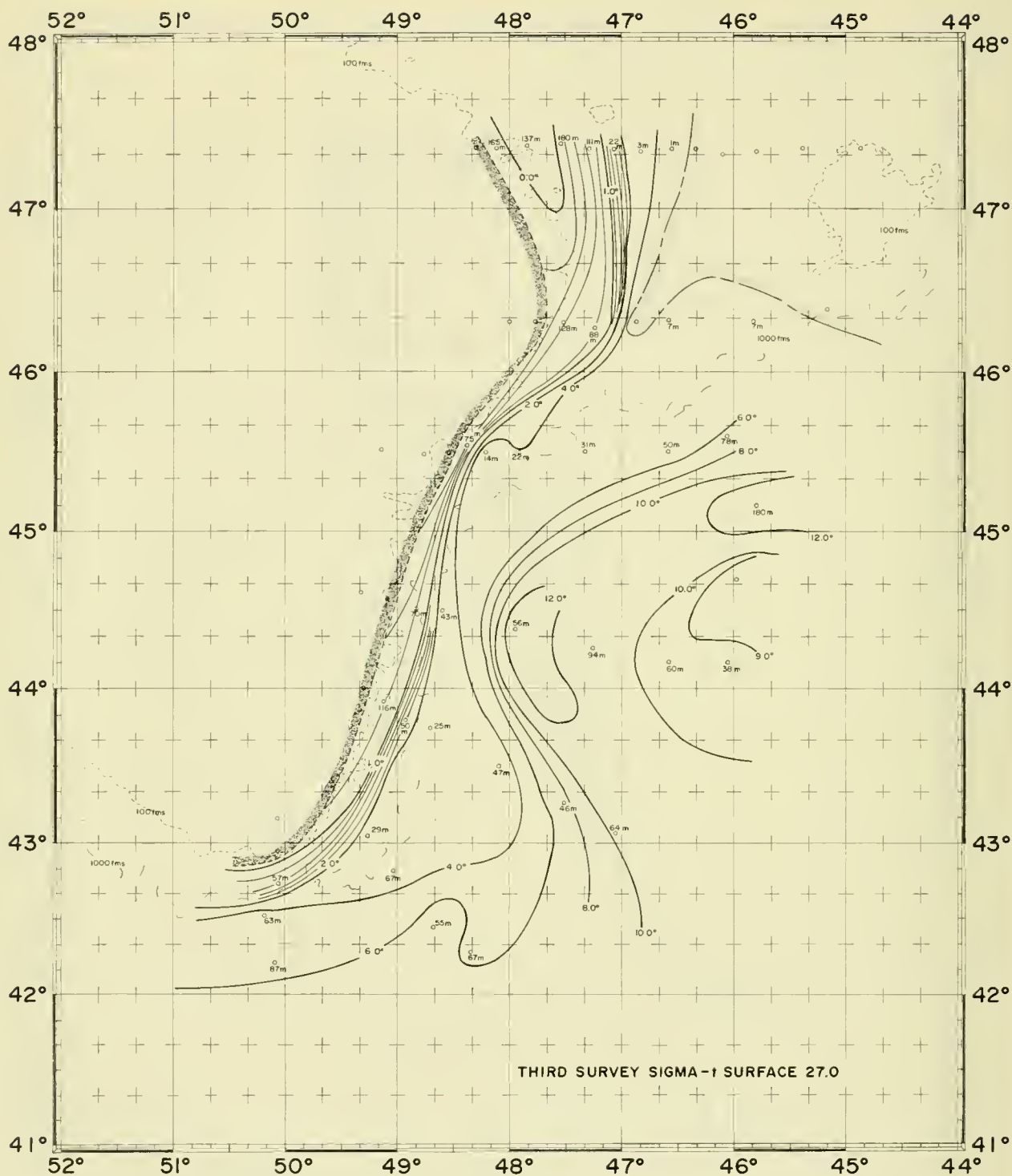


Figure 20A. Sigma-t level, 27.0, showing isotherm contours and sigma-t surface intersections with the bottom and sea surface. Based on data collected during the third survey of the Ice Patrol 1965.

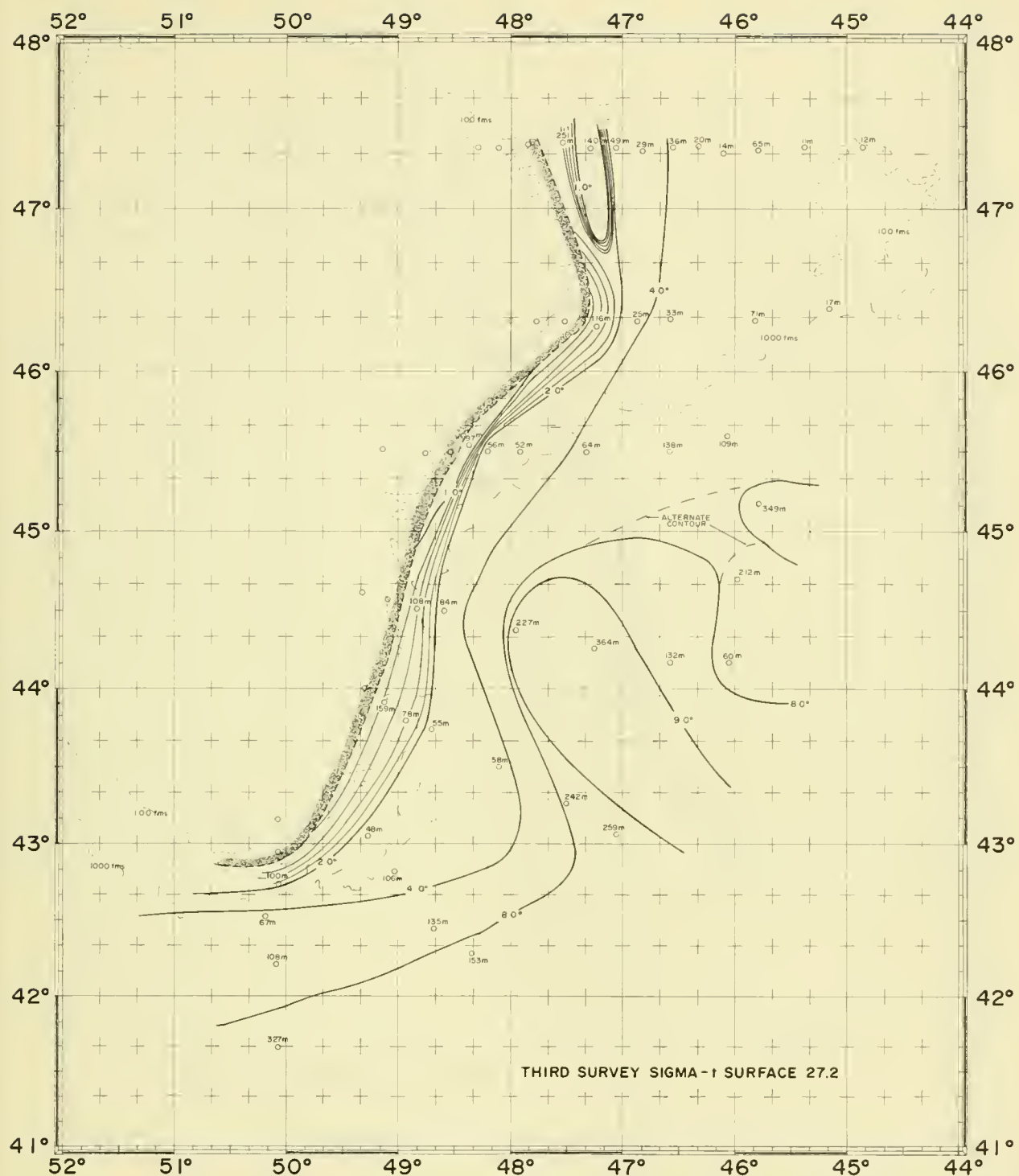


Figure 21A. Sigma-t level, 27.2, showing isotherm contours and sigma-t surface intersection with the bottom. Based on data collected during the third survey of Ice Patrol 1965.

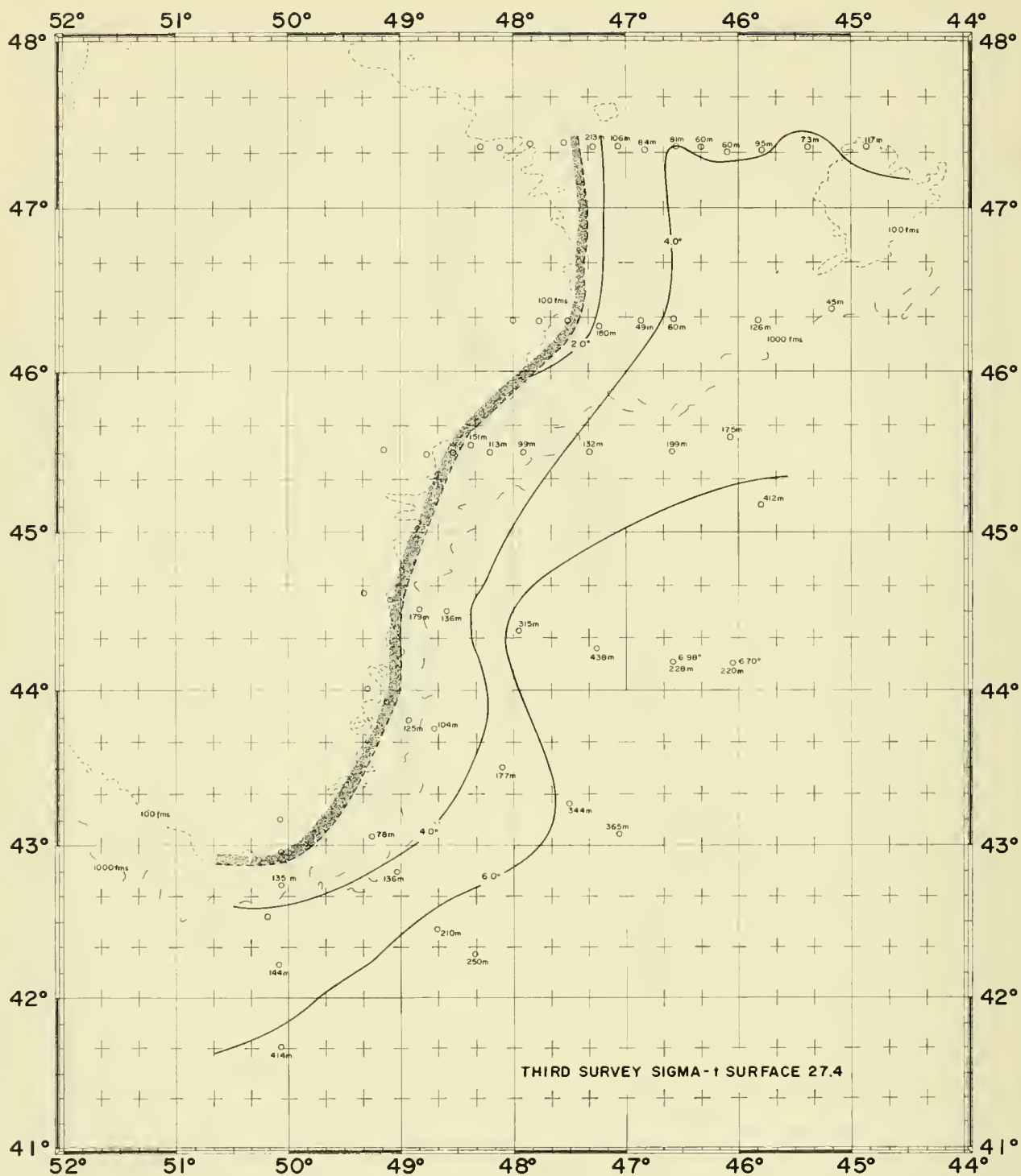


Figure 22A. Sigma-t level, 27.4, showing isotherm contours and sigma-t surface intersection with the bottom. Based on data collected during the third survey of Ice Patrol 1965.



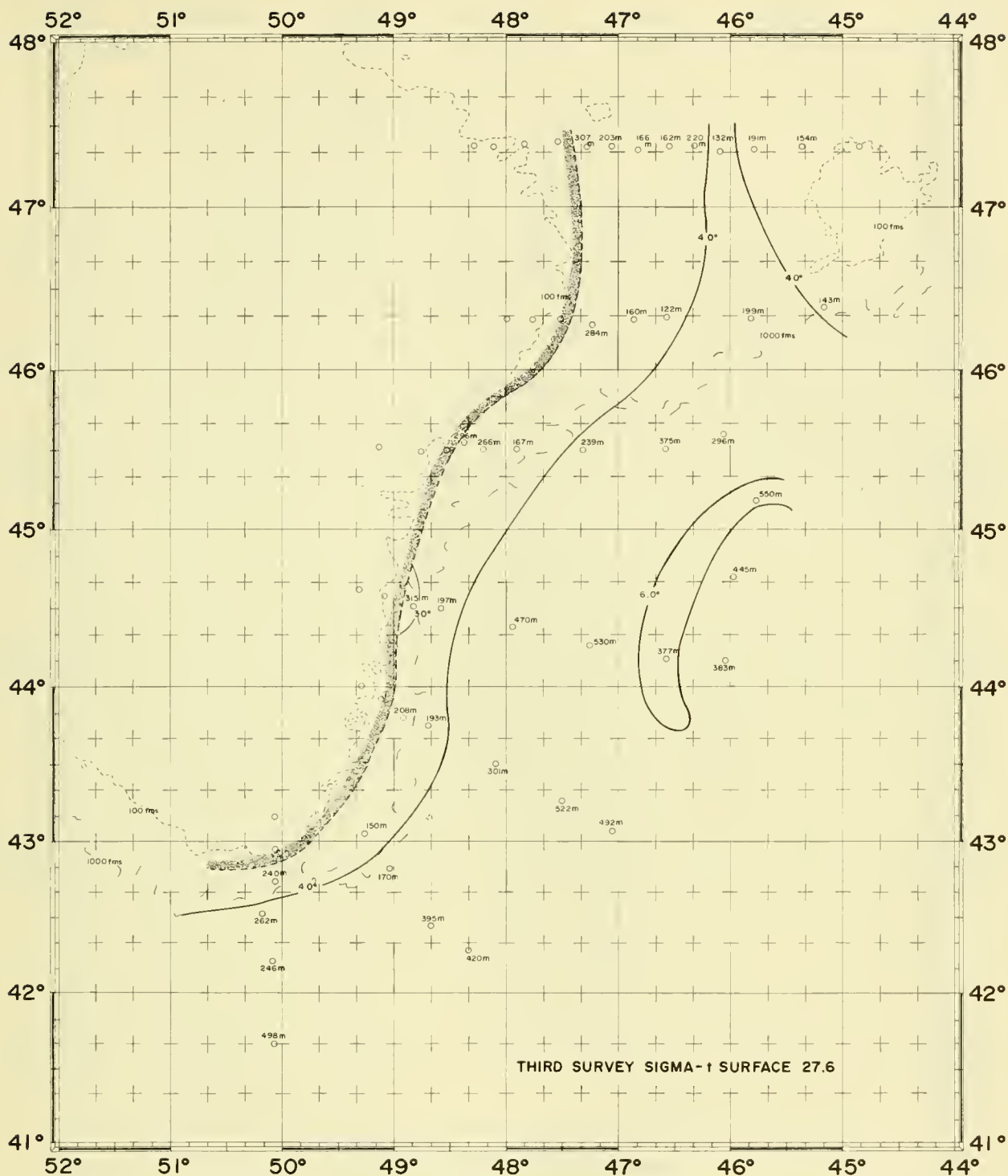
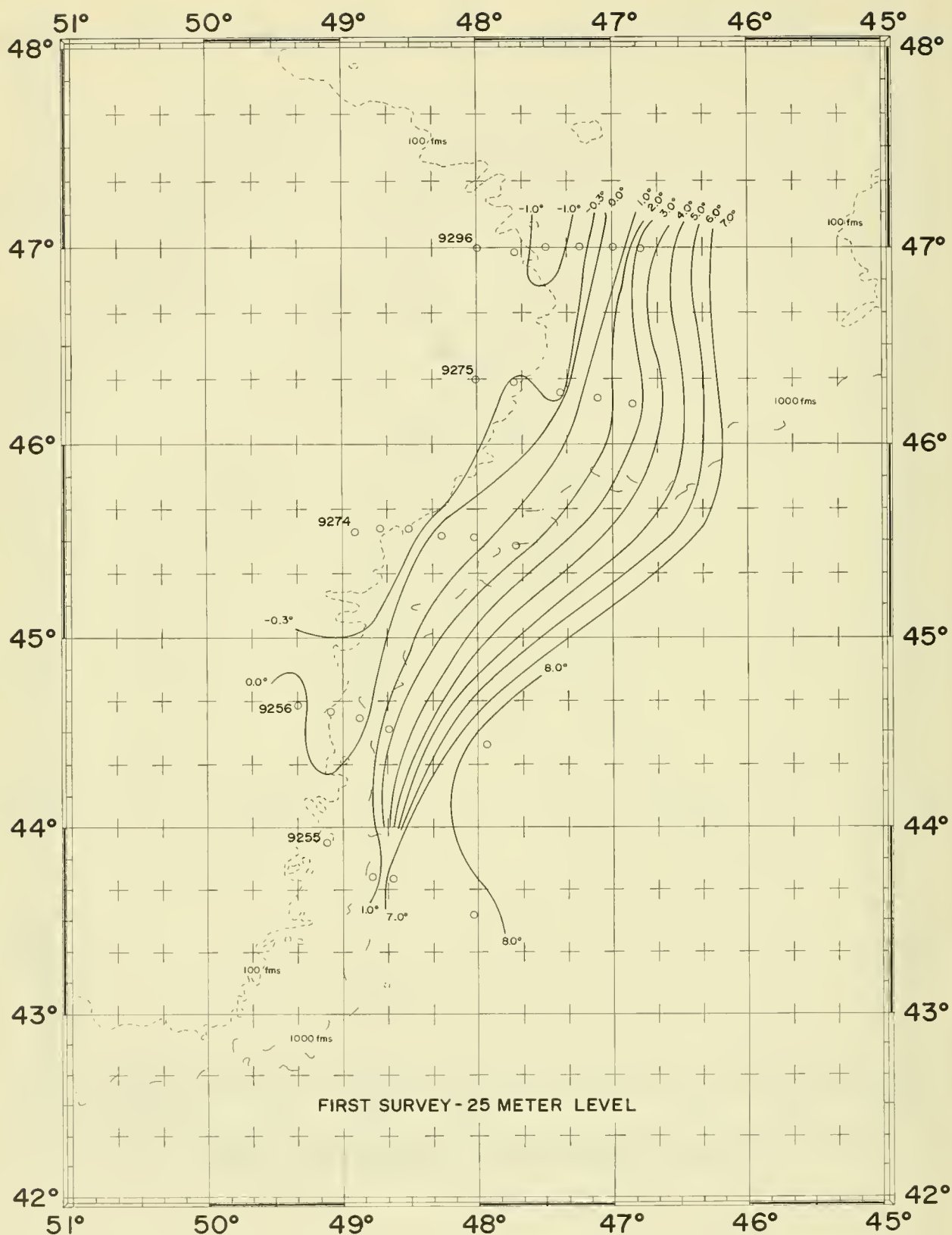


Figure 23A. Sigma- $\tau$  level, 27.6, showing isotherm contours and sigma- $\tau$  surface intersection with the bottom. Based on data collected during the third survey of Ice Patrol 1965.



**Figure 21A.** Isotherm contours at the 25 meter level. Based on data collected during the first survey of Ice Patrol 1965. Contour interval: Heavy lines 2° C., light 0.2° C.

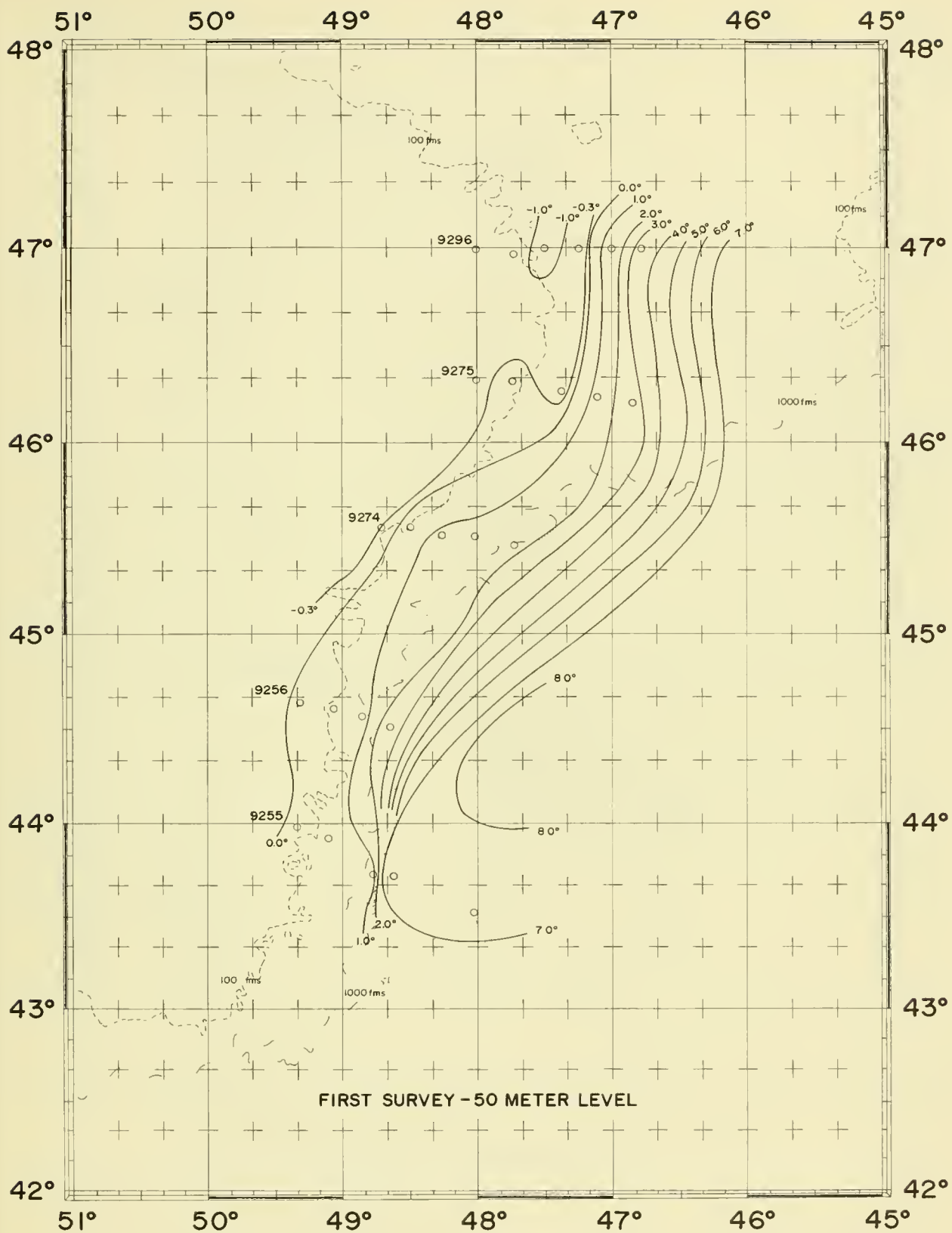


Figure 25A. Isotherm contours at the 50 meter level. Based on data collected during the first survey of Ice Patrol 1965. Contour interval: Heavy lines 2° C., light 0.2° C.

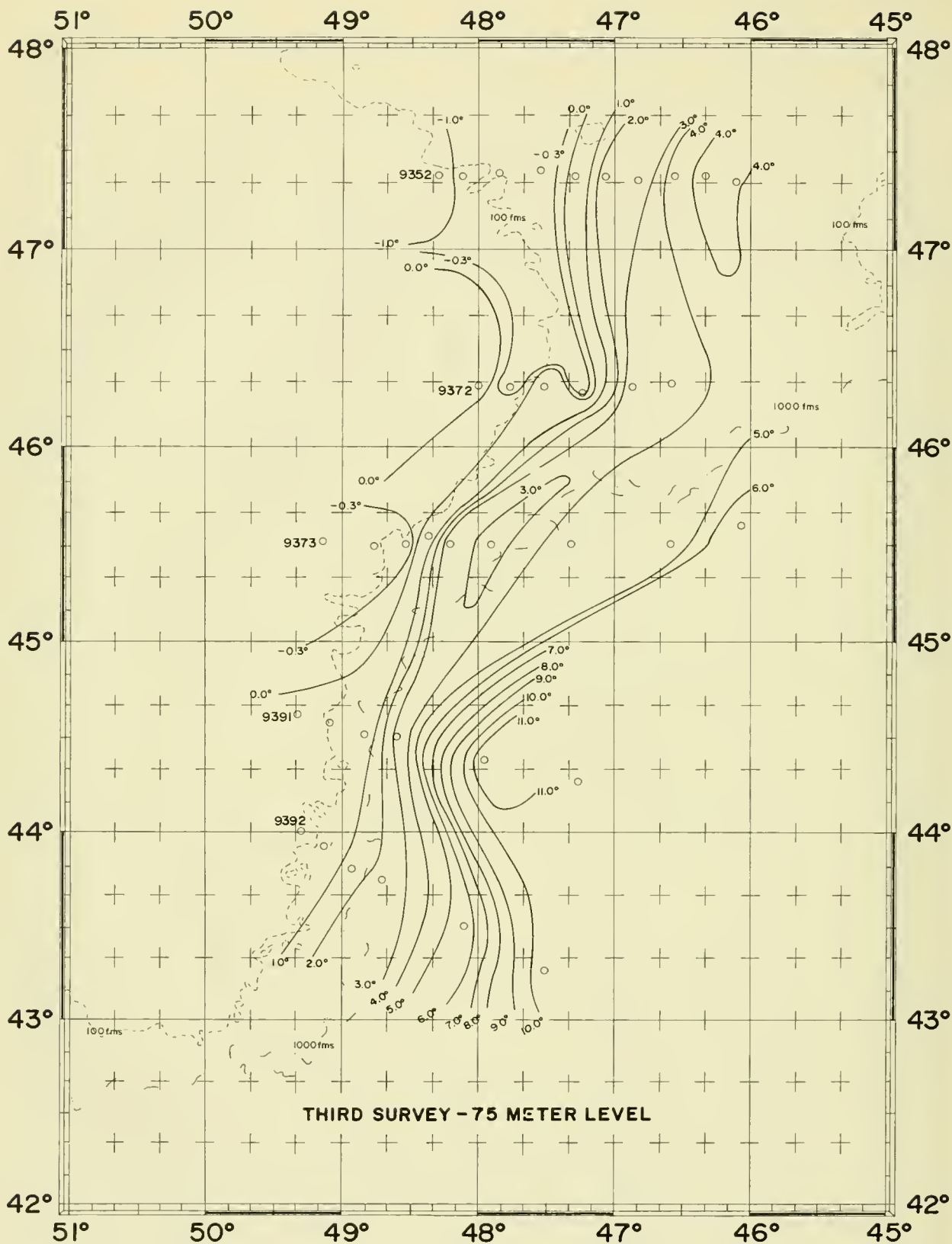


Figure 26A. Isotherm contours at the 75 meter level. Based on data collected during the third survey of Ice Patrol 1965.



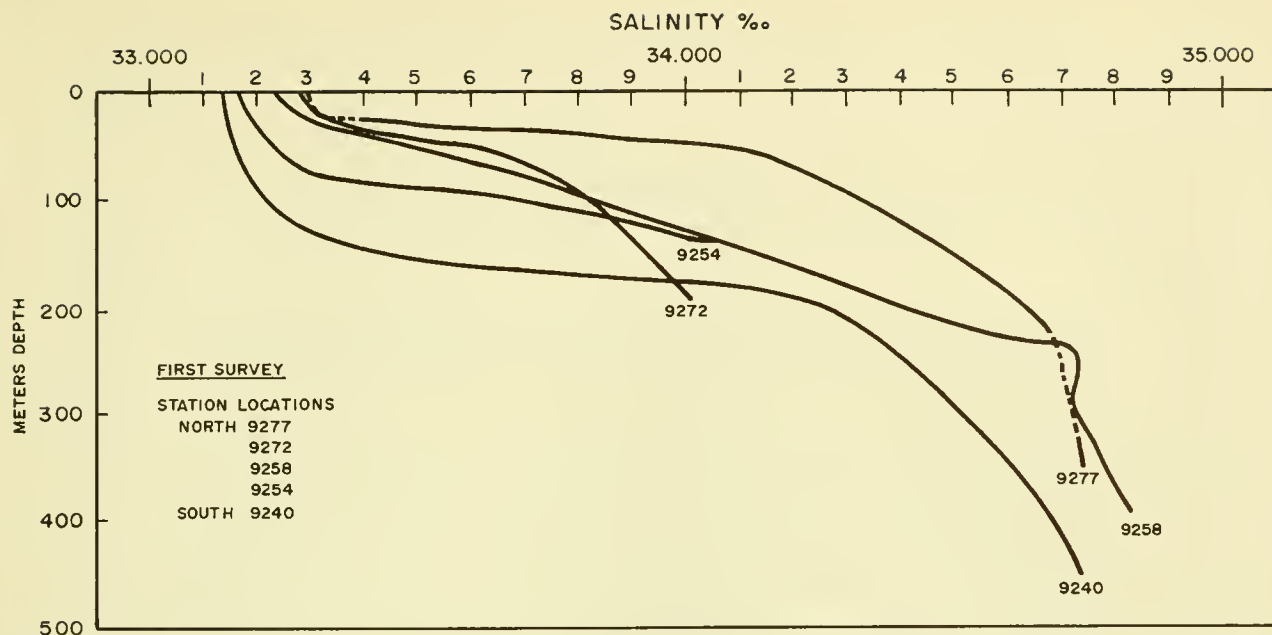


Figure 27A. Vertical distribution of salinity for the line of (center) stations along the core of the Labrador Current. Based on data collected during the first survey of Ice Patrol 1965.

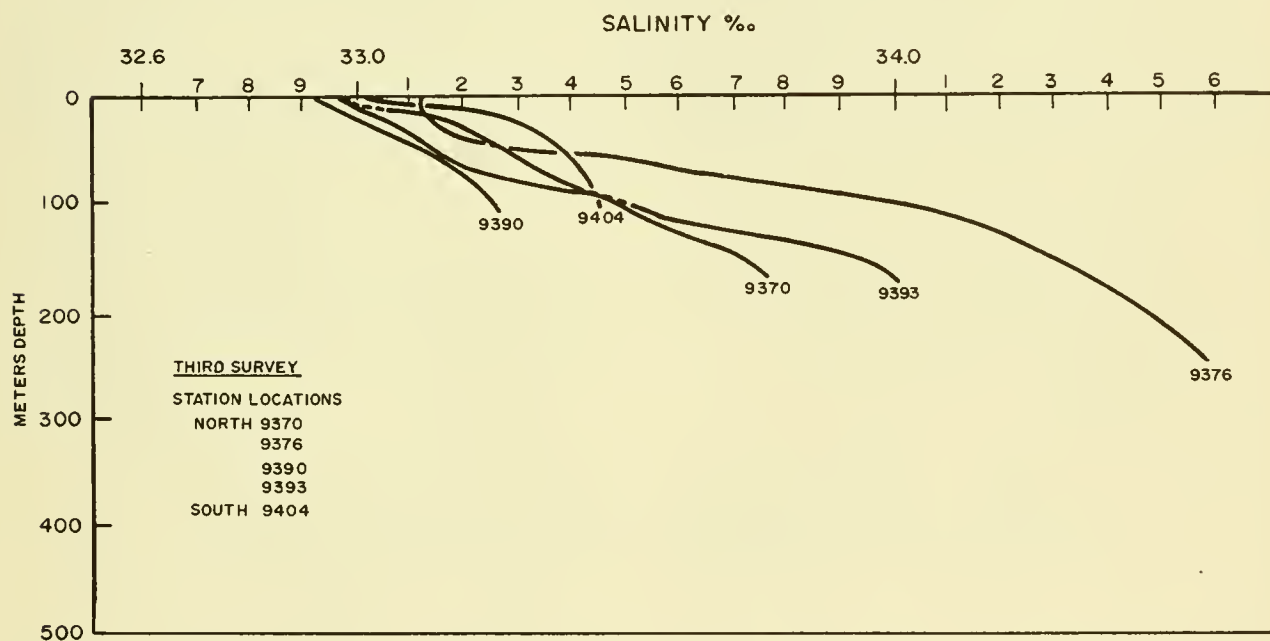


Figure 28A. Vertical distribution of salinity for the line of (center) stations along the core of the Labrador Current. Based on data collected during the third survey of Ice Patrol 1965.

Table 1A

	1st survey	Check survey	3d survey
Volume $\text{m}^3 \times 10^6/\text{sec}$ -----	2. 504	4. 983	4. 708
Heat $^{\circ}\text{C} \text{ m}^3 \times 10^6/\text{sec}$ -----	5. 522	12. 352	10. 202
Mean temperature $^{\circ}\text{C}$ -----	2. 20	2. 48	2. 17
Minimum temperature $^{\circ}\text{C}$ -----	—, 24	—, 34	—, 49
Minimum salinity-----	33. 122	33. 084	32. 895

TABLE IIIA

Date	Dynamic height on Banks, dynamic meters	To 50 m.		Dynamic height of trough, dynamic meters	To 100 m.		Station Nos.	Difference in dynamic height	Volume transport through section $m \times 10^6$ sec.	Minimum temperature of section
		Mean temp., perature °C	Mean salinity		Mean temp., perature °C	Mean salinity				
13-23 Apr. 1949	971.023	0.74	33.30	970.894	4.95	34.342	3789, 3794	-0.129		
7-17 May 1949	971.045	1.93	33.128	971.008	-	33.376	3846, 3849	-0.037		
6-19 Apr. 1950	971.083	-0.85	33.128	970.927	-0.24	33.558	4046, 4050	-0.156	4.34	-1.76
2-13 May 1950	971.072	0.84	33.070	971.000	2.45	33.584	4105, 4108	-0.072	1.50	-1.55
9-20 June 1950	971.079	1.97	33.408	970.930	2.87	33.794	4217, 4221	-0.149	4.00	-1.60
3-15 Apr. 1951	971.112	0.45	32.820	970.966	5.50	33.886	4351, 4355	-0.146	3.21	-1.11
23 May-4 June 1951	971.105	3.78	32.580	970.972	5.23	33.788	4492, 4496	-0.133	2.07	-1.29
29 Apr.-12 May 1952	971.087	1.92	32.830	970.904	2.27	33.350	4808, 4804	-0.183	4.40	-0.74
4-16 June 1952	971.047	4.09	32.83	970.967	7.19	34.23	4908, 4904	-0.080	1.90	-1.04
3-14 Apr. 1953	971.086	0.22	32.94	970.923	2.85	33.82	5033, 5037	-0.163	2.96	-1.36
6-17 June 1953	971.071	1.97	32.60	970.916	2.73	33.65	5217, 5214	-0.155	3.73	-0.41
1-15 Apr. 1954	971.177	-0.27	32.86	970.940	1.12	33.52	5321, 5325	-0.237	5.28	-1.16
26 Apr.-8 May 1954	971.115	-0.11	32.89	970.928	0.18	33.48	5436, 5432	-0.187	4.37	-1.09
27 May-11 June 1954	971.083	0.56	32.93	970.919	1.66	33.746	5517, 5521	-0.164	4.52	-0.63
1-13 Apr. 1956	971.036	0.08	33.20	970.897	3.78	34.168	6077, 6080	-0.139	3.58	-0.46
19 May-1 June 1956	971.098	1.34	32.94	970.911	2.14	33.795	6171, 6175	-0.187	4.87	-1.04
4-18 Apr. 1957	971.126	-0.48	33.093	970.898	1.87	34.025	6384, 6388	-0.228	5.83	-1.10
1-12 May 1957	971.110	-0.50	32.928	970.913	1.61	34.091	6474, 6477	-0.197	4.69	-1.50
3-15 Apr. 1958	971.153	0.62	32.862	970.947	5.43	34.070	6614, 6619	-0.206	5.50	-0.30
23 May-5 June 1958	971.140	3.80	32.758	970.966	3.99	33.734	6789, 6794	-0.174	4.29	-0.55
5-18 Apr. 1959	971.129	-0.04	33.130	970.906	2.48	34.206	6931, 6934	-0.223	5.38	-1.31
30 Apr.-11 May 1959	971.066	-0.24	33.228	970.899	2.37	33.996	7018, 7022	-0.167	3.72	-0.85
27 May-6 June 1959	971.132	0.81	32.925	970.951	2.70	33.815	7104, 7107	-0.181	4.14	-1.07
2-17 Apr. 1960	971.131	0.23	33.022	970.916	2.20	33.800	7345, 7350	-0.215	5.59	0.02
18 June-1 July 1960	971.136	4.38	32.525	970.914	4.50	33.951	7493, 7496	-0.252	4.54	-1.36
2-15 Apr. 1961	971.008	-0.57	32.950	970.916	3.12	33.996	7628, 7632	-0.092	1.46	-0.65
25 May-5 June 1961	971.093	1.92	32.888	970.920	3.19	34.034	7772, 7776	-0.173	3.42	-0.45
1-13 Apr. 1962	971.138	0.48	33.085	970.905	2.66	33.994	7991, 7996	-0.233	6.31	-0.97
23 May-3 June 1962	971.132	1.86	32.802	970.959	1.29	33.645	8158, 8161	-0.173	5.24	-0.69
30 Mar.-8 Apr. 1963	971.145	-0.80	33.065	970.915	0.44	33.823	8427, 8431	-0.230	6.62	-1.17
14-25 May 1963	971.105	1.60	32.848	970.900	0.53	33.274	8584, 8587	-0.200	4.48	-0.64
5-16 Apr. 1964	971.045	-0.24	33.347	970.922	1.45	34.123	8834, 8838	-0.123	4.35	-0.96
2-13 May 1964	971.120	-0.10	33.074	970.900	4.08	33.985	8984, 8989	-0.220	6.75	-1.05





# Interim Report

## Iceberg Deterioration

by

RONALD C. KOLLMAYER, U.S. Coast Guard

### Introduction

The problem of iceberg deterioration is an intimate part of iceberg forecasting. The ability of commander, International Ice Patrol to make accurate predictions of the positions of icebergs that may menace the shipping lanes depends not only on reliable drift data but dependable estimates of life expectancy as well. At present, the only way to determine when a berg can be dropped from consideration is by direct observation of its progressive reduction in size. Hence, as techniques of drift prediction are perfected and scouting for position becomes less necessary, there must be a corresponding increased ability to predict deterioration rate, if any substantial saving in man hours, fuel and equipment are to be safely realized. This will require perfection of the techniques to the point where accurate automatic downgrading of specific bergs can be made with complete confidence without actually viewing them.

Some attention has been given to the problem of iceberg deterioration since 1912, however no quantitative work was ever accomplished which would lead to reasonably precise predictions.

The idealized solution to the problem calls for a detailed examination of the heat budget of an iceberg. Basically, the heat transfer into a berg causes melting, the rate of which is dependent upon many factors. Coupled with the melting is the phenomena of calving or the breaking off of ice pieces. The calving problem complicates prediction schemes because of its randomness in both quantity and frequency. Mass distribution, prominence configuration and existing cracks all play a part in calving thus rendering the calving problem unpredictable under any conditions.

Detailed heat transfer studies can be accomplished for small areas of ice surface, but difficulty arises when these studies are extended to the entire surface of an iceberg. Unequal heat transfer, caused by unequal temperature distributions and

turbulence, prevents the extension of mathematical relationships to actual conditions and makes modeling difficult. The underwater configuration also plays a major part in the deterioration by presenting varying surface areas for a given mass. These shapes can only be speculated on until actual observations are made. In the interim gross conclusions must be drawn to categorize the subsurface shapes and sizes into groups, sub-groups and deterioration types. These types reflect the mass to surface area ratios which affect the heat transfer and melting rates. At present only the portion of the berg above the water can be classified by deterioration type. Bergs of the drydocked or pinnacle shapes tend to have low mass to surface area ratios while a blocky or spherical berg tends to have a larger ratio. While these ratios play a role in grouping surface deterioration types, no consideration can be given to the underwater portion because of the lack of ability to determine the underwater configuration.

The logical direction for research in berg deterioration should be along statistical lines. Basic deterioration parameters must be measured along with quantitative mass size changes in an attempt to correlate the data and develop an effective method for predicting deterioration rates. This prediction method must be based on easily obtainable parameters such as air and water temperatures, wind velocities, sea state, berg size, and configuration.

### Previous Work

In the past no really quantitative work has been performed on berg deterioration. Much is available in the descriptive field of berg disintegration but basic correlative data along with mass changes are not available.

Barnes (1912) one of the early observers of bergs, made water temperature measurements in the vicinity of icebergs in and near the Strait of

Belle Isle and postulated the causes of observed surface warming as a berg is approached. He further elucidated on this warming phenomena near bergs and the part it plays in deterioration in a 1913 report and again in 1927. Barnes (1927) looked closely at the physical properties of bergs, including the quantities of entrapped air. He speculated on the causes of calving based on his observations of river ice. A correlation was drawn by Barnes between the internal thermal stresses set up by natural conditions, i.e., the sun, and the calving that resulted. He cites observations made in bright sunlight, concluding that the penetrating rays through the clear melt water on the bergs surface sets up the expansion stresses. He attempted to create these stresses by using thermite bombs to induce greater calving. Zeusler (1926) and Ricketts (1930) made qualitative studies of the melting processes supported by actual observations. Smith (1931) summarized the basic knowledge to date, citing the various methods of berg deterioration and the conditions causing them. He made detailed observations of several bergs deteriorating under different environmental conditions. The next work of significance occurred when Bullard (1960) reported on the attempts to destroy bergs. Thermite bombs were used to duplicate the experiments of Barnes (1927). High explosive bombs were also tried to fracture the larger bergs, and the melting of a berg was "hastened" by covering it with lampblack. All of these methods attained only a limited degree of success and were not pursued further. In 1960 a program was initiated to gather statistical deterioration data on bergs. Coast Guard ships of opportunity were to make studies on deterioration when required to standby dangerous bergs drifting in the shipping lanes. No information as to whether or not the project gathered any useful data is available, however, very few bergs in the past 5 years have required a standby vessel.

In 1964 a preliminary study was conducted by Ice Patrol (Kollmeyer et al, 1964) in order to gain some insight into the problem and to develop the techniques required for future work. A berg was observed over a week's time in a relatively warm air environment and in water slightly above 0° C. Unfortunately quantitative size measurements were of no value due to the inaccuracy of radar determined ranges and no correlation work could be accomplished. The various problems encountered, particularly those of size and shape measurements, lead to the use

of more elaborate and effective equipment during the 1965 study.

## Theoretical Analysis

The deterioration parameters that can be considered the most important are those which contribute to the actual melting of a berg. Calving or breakage is random, and at the present time cannot be directly tied to environmental conditions. All forms of heat transfer must be examined. Basic principles of thermodynamics indicate that to develop a workable estimate and prediction system, all aspects of radiative heat transfer along with detailed analysis of the small scale phenomena of the fluid boundary layers must be investigated.

The intent herein is not to present an all encompassing document of heat transfer to icebergs, but to outline an intensive study that will ultimately lead to accurate deterioration prediction models.

The heat budget of an iceberg can be described as follows:

$$\text{Net heat added} = (Q_s - Q_r) + Q_a + Q_w + Q_{awr} - Q_{ir} \quad (1)$$

Net heat added = heat required to raise a berg's temperature. In this treatment, complete melting is the primary concern, therefore the net heat added will be considered as that heat used to raise a berg's temperature to 0° C. and to melt the ice (heat of fusion).

$Q_s$  = direct incoming solar radiation

$Q_r$  = solar radiation reflected from a berg's surface

$Q_a$  = convective-conductive heat from the air

$Q_w$  = convective-conductive heat from the water

$Q_{awr}$  = air and water radiative transfer to berg

$Q_{ir}$  = iceberg back radiation

A quantitative look must be given to the heat budget equation of a berg to determine which terms are important and which ones can be dropped. A hypothetical berg will be used for this purpose. Deterioration data based on years of experience will be drawn from Ice Patrol (Lenczyk 1964), as shown in table 1C. Listed therein are rules of thumb used to predict the life of various sized bergs in several different water temperature environments. These are gross figures and will be utilized only to show the importance of each heat transfer process. The selected figures to be used are 2.2° C. water tem-



perature, medium sized, blocky berg, and a deterioration time of 20 days ( $2.88 \times 10^4$  min.). The dimensions of the berg selected are 100 meters wide, 100 meters long, and 300 meters in overall height. Using an ice density of  $0.9 \text{ gm/cm}^3$  (Smith 1931) this gives an above the water height of 30 meters. With a total mass of  $2.7 \times 10^{12}$  gms and a surface area of  $1.4 \times 10^9 \text{ cm}^2$ .

Because the berg is constantly being reduced in size, it will be assumed that this reduction is linear as far as its surface area is concerned over the 20-day period. This means that a representative area, integrated with respect to time, can be assumed to be one-half of the initial surface area which would be  $7.0 \times 10^8 \text{ cm}^2$ .

Before proceeding with the analysis a few more assumptions must be made. The net heat added to an iceberg must be utilized for both raising the berg's temperature to its melting point and for heat of fusion to melt the berg. Barnes (1927) has shown that the icebergs are basically fresh water and can even be compared to distilled water. Due to the bergs glacial origin this seems reasonable and therefore, the physical constants for fresh water such as heat of fusion may be applied to icebergs.

According to Bader (1961) direct temperature measurements of the Greenland ice cap indicate that as the various glaciers flow towards the sea they assume an internal temperature similar to the mean annual air temperatures. Furthermore, the internal temperatures are found to be quite uniform from top to bottom varying only about  $1^\circ \text{ C}$ . Bader shows that in the vicinity of the Jacobs-haven glacier, postulated by Smith (1931) to be a prime source of bergs, a temperature of about  $-12^\circ \text{ C}$ . would apply. For this paper this figure will be assumed to be the minimum internal temperature of an iceberg.

During melting, the berg's surface would be  $0^\circ \text{ C}$ . and it would have a negative internal temperature gradient. This gradient would certainly be a variable and some actual measurements will be required. For the purpose of this treatment it will be assumed that a specific portion of received heat will be utilized for raising the berg's surface temperature to  $0^\circ \text{ C}$ . prior to melting and maintaining the thermal gradient.

The quantities ( $Q_s - Q_r$ ) of equation (1) are affected by the icebergs particular properties of absorption and reflection.  $Q_s$ , the incoming solar radiation, is an environmental property which not only tends to provide direct heat energy for

melting the bergs surface but also indirect energy for heating the bergs environment.

The nature of the ice surface on which this incoming radiation ( $Q_s$ ) falls, is an important factor in determining the effectiveness of this heat source. Before any heating can take place, the radiant energy must penetrate this surface. The ratio of reflected energy to incident energy, or albedo, provides the first tool for estimating the heat energy available for melting. The albedo percentage must be estimated from measurements made on snow fields since no direct observations have been made on icebergs. Clean snow fields are very similar to icebergs because of the extreme whiteness of bergs due to their saturation with air bubbles. The air bubbles decrease the transparency of bergs and cause scattering of the incident radiation increasing the reflection. Albedo measurements have been made for sea ice, however, puddling, brine pockets, and darkened transparent areas can severely reduce the albedo and prevent comparison.

Chernigovskii (1939) shows snow albedos range from 87 percent during March to 60 percent during July in the Arctic. This reduction is due primarily to melting, puddling and surface texture changes during the summer. Numerous investigators have looked at the albedo of Antarctic snow fields. Hoinkes (1960) indicates that values ranging from 75 to 93 percent have been found for instantaneous measurements. A value of 80 percent seems reasonable for a berg and will be assumed until more accurate measurements can be obtained. Actually, the albedo of a snow field should be somewhat lower than a berg's because of the berg's facets. These facets cause random reflection which scatters a great deal of the incident radiation. This phenomena is variable depending on a particular berg's configuration and can be treated in general terms only, however, it is reasonable to suspect that the albedo might be a good deal higher than the assumed 80 percent.

Solar radiation values from Hess (1959) show that at  $45^\circ \text{ N}$ ., a latitude of Ice Patrol interest, the maximum incoming radiation reaching the earth's surface during March and June ranges from 0.14 to  $0.38 \text{ gm cal/cm}^2/\text{min}$  on a 24-hour basis. Some direct measurements, figure 1c, show that during a week in April 1965 an average of  $0.14 \text{ gm cal/cm}^2/\text{min}$  were received in the Ice Patrol area of the Grand Banks of Newfoundland.

Using an albedo of 80 percent, a figure for solar radiation into the berg ( $Q_s - Q_r$ ) of 0.03 gm cal/cm<sup>2</sup>/min is obtained. Applying this figure to the hypothetical berg described above, and taking only that portion of the berg above the water that receives this radiation, it is found that  $1.1 \times 10^8 \text{ cm}^2 \times 0.03 \text{ gm cal/cm}^2/\text{min} \times 2.88 \times 10^4 \text{ min} = 0.095 \times 10^{12} \text{ gm cal}$  of heat received by the berg during its 20-day decay period.

Back radiation ( $Q_{ir}$ ) from a berg represents a loss of heat in the budget. Surface and near surface radiative losses will be the most important and would certainly be more intense than any radiation from the colder interior. The Stefan-Boltzman radiation law states that  $Q = k\sigma T^4$ ; where  $\sigma$  is the universal cgs units constant of  $8.312 \times 10^{-11} \text{ gm cal/cm}^2/\text{K}^4 \text{ min}$ ,  $T$  is the absolute temperature degrees Kelvin, and  $k$  is blackbody or perfect radiation constant. According to Shumskiy et al. (1964) the radiative ability of snow, the  $k$  constant, is as high as 0.99. If 0° C. is assumed for the surface, an upper value of radiated heat loss from the berg can be estimated and would be on the order of 0.46 gm cal/cm<sup>2</sup>/min. Assuming radiative heat loss from the total surface of the hypothetical berg results in a  $Q_{ir}$  of  $0.46 \text{ gm cal/cm}^2/\text{min} \times 2.88 \times 10^4 \text{ min} \times 7.0 \times 10^8 \text{ cm}^2 = 9.26 \times 10^{12} \text{ gm cal}$  during the decay period.

It should be pointed out that the maximum radiative intensity from the sun comes in at about  $0.48\mu$ , indicating that the greatest intensity lies in the visible range. The reradiated energy from the berg will follow the Wien's displacement law which states that the maximum radiative frequency ( $\lambda_{\text{max}}$ ) is a function of temperature:

$$\lambda_{\text{max}} = \frac{2897}{T^\circ \text{K}}$$

where  $T$  is in degrees Kelvin. This says that the berg will radiate energy in the vicinity of  $10\mu$  or long wave radiation. The frequency of emission is also the frequency of greatest absorption therefore a berg will readily receive long-wave radiation from its fluid environment.

Radiative heat transfer from the berg's environment ( $Q_{awr}$ ) involves so called blackbody radiation based on the environmental absolute temperatures. Using the Stefan-Boltzman radiation law and assuming perfect blackbody radiation for temperatures from 0° C. to 20° C., it is found that the radiative heat transferred to a berg varies from  $46.1 \times 10^{-2} \text{ gm cal/cm}^2/\text{min}$  to  $61.3 \times 10^{-2} \text{ gm cal/cm}^2/\text{min}$  as shown in figure 6C. This trans-

fer of heat will affect the berg proportionately as the air and/or sea temperature varies. The fluid environment radiation is not perfect blackbody radiation as is the sun's but is considered more of a greybody type. However for the purposes of this paper, perfect radiation will be assumed to obtain maximum heat transfer values. Because most of the berg's mass is below the water surface, the water will dominate the radiative heat transfer quantities. This long-wave radiation is absorbed most readily by a berg and since the fluid environment is surrounding the berg on all its facets, reflection due to angular incidence would be minimal. For this reason, consideration of an albedo would probably not apply in this situation. As can be seen from figure 6C, even with the air at a higher or lower temperature than the water, the overall radiative effect will be little changed. This is true not only because of the small magnitude change in  $Q$  due to warmer or cooler air, but because of the smaller surface area presented to the air compared to that bathed in the sea. Using the total hypothetical berg surface area and equal air and water temperatures, arbitrarily taken at 2.2° C., gives a heating contribution of  $0.48 \text{ gm cal/cm}^2/\text{min} \times 7.0 \times 10^8 \text{ cm}^2 \times 2.88 \times 10^4 \text{ min} = 9.67 \times 10^{12} \text{ gm cal}$ .

Summing up the computed quantities thus far:

$$Q_s - Q_r = 0.095 \times 10^{12} \text{ gm cal}$$

$$Q_{awr} = +9.67 \times 10^{12} \text{ gm cal}$$

$$Q_{ir} = \frac{-9.26 \times 10^{12} \text{ gm cal}}{0.505 \times 10^{12} \text{ gm cal}} \text{ net heat added.}$$

As mentioned, the net heat added to a berg is utilized for both melting and raising the berg's temperature to 0° C. The amount of heat needed to raise the hypothetical berg's  $2.7 \times 10^{12} \text{ gms}$  of ice from -12° C. to 0° C. will be given by:

$$Q_{\Delta T} = c_p \times \Delta T^\circ \times M$$

where:

$M$  = mass of the berg

$c_p$  = specific heat of ice at -12° C.

therefore:

$$Q_{\Delta T} = 0.49 \text{ gm cal/gm } ^\circ\text{C.} \times 12^\circ \times 2.7 \times 10^{12} \text{ gm} = 15.85 \times 10^{12} \text{ gm cal.}$$

The rest of the added heat must go into the heat of fusion which would equal:  $Q_f = h_f \times M$



where:

$h_f$  = heat of fusion of water

therefore  $Q_f = 79.7 \text{ gm cal/gms} \times 2.7 \times 10^{12} \text{ gms} = 215.0 \times 10^{12} \text{ gm cal}$ . This means that  $230.9 \times 10^{12} \text{ gm cal}$  of heat are needed to melt this model berg in the 20-day period. However, only  $0.505 \times 10^{12} \text{ gm cal}$  have been accounted for. Therefore the remaining heat must come from sensible heat transfer from the environment by conduction and convection. Because the heat transferred by conduction and convection amounts to approximately 500 times the amount of heat added by radiation, the terms  $(Q_s - Q_r)$ ,  $Q_{tr}$ , and  $Q_{awr}$  can be dropped from the heat budget equation as negligible and the most attention must be given to conduction and convection. This is somewhat contrary to what is found in the literature concerning studies of glaciers. Heat budgets presented by Hoinkes (1964) for various glaciers in the northern hemisphere show that short-wave radiation accounts for up to 89 percent of the source of incoming heat after consideration of albedo. This means only 11 percent of the incoming heat is supplied by environmental temperatures. These figures are not applicable to an iceberg due to the percent of surface area exposed to solar radiation and because of the berg's warmer environmental subarctic temperatures. The submergence of a berg in a comparatively warm liquid, with a high specific heat, cannot be compared with the exposure of a glacier's surface to arctic winds.

The problem of examining the conductive-convective terms,  $Q_a$  and  $Q_w$ , is complicated by the turbulence of the environmental fluids and the random surface configurations of the visible and submerged portions of the berg. For these reasons, the terms  $Q_a$  and  $Q_w$ , the conductive-convective heat flow from the fluid environment to the berg must be examined from first principles of thermodynamics in order to gain a more thorough understanding of the problem. Prandtl (1952) analyzed the heat flow, from a moving fluid, through a boundary. The following discussion is based on his treatment. In the case of laminar flow of fluid past a boundary, i.e., water or air flow past a berg's surface, it is a fundamental concept that a velocity gradient is established as the boundary is approached. This gradient ranges between the velocities of 0 at the boundary to maximum flow at a given distance away from the boundary. The gradient is the result of fluid

friction. The thickness of the velocity gradient, or boundary layer, is a function of the viscosity of the fluid and the velocity of flow. In the case of laminar flow, all movement is parallel to the direction of flow.

Heat transfer in laminar flow is given by the equation of continuity as follows:

$$\frac{\partial Q_1}{\partial x} + \frac{\partial Q_2}{\partial y} + \frac{\partial Q_3}{\partial z} = 0$$

$Q_1$  is the heat transfer along the direction of flow given by  $Q_1 = c_p \rho u T$ , where  $c_p$  is the constant pressure specific heat,  $\rho$  is the density,  $T$  is the temperature and  $u$  is the rate of flow.  $Q_2$  is the heat lost in the direction of maximum temperature gradient, in this case to the boundary due to con-

duction, and is given by  $Q_2 = -k \frac{\partial T}{\partial y}$  where  $k$  is the

molecular thermal conductivity coefficient. Since the thermal conductivity of fluids is small, there is an abrupt fall in temperature as the boundary is approached. The thickness of the thermal boundary layer in laminar flow is a function of the velocity distribution near the boundary and the thermal conductivity of the fluid. A low thermal conductivity and high viscosity will form a thick heat barrier giving a low heat transfer compared to higher conductivity and low viscosity for the same fluid velocities.  $Q_3$  is the same as  $Q_2$  in the  $h$  direction. No thermal gradient is assumed in the direction of flow due to flow velocity ( $u$ ), hence no molecular transfer. In nature, flow is seldom laminar. In the case of fluid movement around icebergs, configuration and surface roughness would rule out laminar flow entirely. The above relationship must be modified to include turbulence.

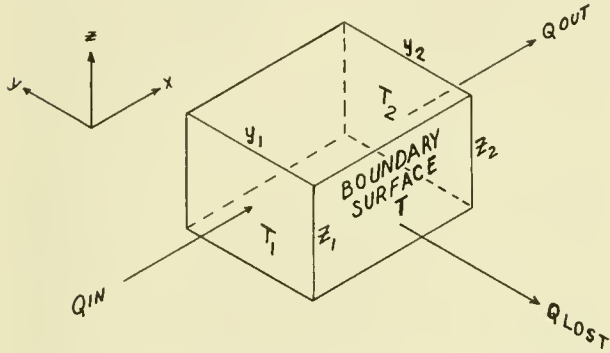
In turbulent flow the boundary layer concept is retained, however, great reduction in its thickness occurs. Turbulence provides still another mechanism for heat transfer; that of apparent heat conduction. The temperature distribution away from the boundary, in the turbulent case, is uniform due to mixing. As the boundary is approached there is an abrupt fall in temperature. This provides for a heat flow in the direction of the maximum gradient. This is given by

$Q = -c_p A_q \frac{\partial T}{\partial n}$  where  $A_q$  is the eddy exchange coefficient. This type of heat flow disappears as the laminar subboundary layer is reached where molecular transfer must complete the flow. The

equation of continuity shown by Prandtl (1952) now takes the form of:

$$\rho c_p u \frac{\partial T}{\partial x} - \frac{\partial}{\partial y} \left\{ (c_p A_q + k) \frac{\partial T}{\partial y} \right\} - \frac{\partial}{\partial z} \left\{ (c_p A_q + k) \frac{\partial T}{\partial z} \right\} = 0$$

Assume now an element of fluid on the boundary surface with one side acting as the heat flow boundary and with no heat flow assumed in the direction as shown below.



It can be assumed that the heat ( $Q$ ) lost through the boundary surface must pass through the boundary layer and must equal the heat lost between the sections  $y_1 z_1$  and  $y_2 z_2$ . This is true even in the turbulent case since  $A_q$  is zero in the laminar subboundary layer. The continuity expression shown above now reduces to

$$\rho c_p u \frac{\partial T}{\partial x} - \frac{\partial}{\partial y} \left( k \frac{\partial T}{\partial y} \right) = 0$$

or over the area of the surfaces

$$c_p \rho \iint u (T_1 - T_2) dy dz = \iint k \left( \frac{\partial T}{\partial y} \right) dx dz$$

From this expression it is apparent that the heat transfer through the boundary surface is controlled entirely by the thickness of the laminar subboundary layer and the thermal conductivity. This means that if  $u$  is low enough, assuming good mixing within the elemental volume, the heat flow through the boundary will be limited by the amount of heat coming in. In this case the temperature  $T_2$  would be equal to the temperature at the boundary. As  $u$  increases,  $T_2$  will become greater than the boundary temperature and approach  $T_1$  in value. At the same time

more heat will be provided for boundary transfer. When this occurs, the heat flow across the boundary tends toward an equilibrium condition where  $T_1 - T_2 \rightarrow 0$ , and  $\frac{\partial T}{\partial y} \rightarrow \frac{\partial T_1}{\partial y}$ . The equilibrium condition is never reached as long as ( $u$ ) increases. This is because the gradient  $\frac{\partial T}{\partial y}$  will increase with ( $u$ ) as the thickness of the laminar subboundary layer is reduced.

The difficulty in evaluating the conductive-convective heat transfer relationship shown above is lack of knowledge of the temperature gradient  $\frac{dT}{dy}$  near the surface of the berg. The gradient is impossible to measure due to its minute thickness when turbulent flow exists. It does not lend itself to modeling due to the variable effects of large and small eddies created by the erratic surface shapes found on bergs. Schlichting (1960) shows the Reynolds analogy which allows the derivation of relations for heat transfer from relations for turbulent flow. This is convenient since fluid velocity measurements near boundaries have been made and eventually may be attempted in the vicinity of an iceberg. In the Reynolds analogy,

Prandtl numbers given by  $P_t = \frac{A_r}{A_q}$  and  $P = g c_p \frac{\mu}{k}$  are defined showing the relationship of the eddy and molecular transfer coefficients for convenience of notation. The basic equation showing momentum transfer and heat transfer, within both the turbulent and laminar subboundary layers is given by:

$$\tau = (\mu + A_r) \frac{d\bar{u}}{dy} \text{ (stress)} \quad (2)$$

$$q = -c_p g \left( \frac{k}{c_p g} + A_q \right) \frac{d\bar{T}}{dy} \text{ (heat)} \quad (3)$$

where:

$\frac{d\bar{u}}{dy}$  = velocity gradient in a particular layer

$\frac{d\bar{T}}{dy}$  = temperature gradient in a particular layer

$\mu$  = molecular coefficient of viscosity

$A_r$  = eddy coefficient of momentum transfer

$A_q$  = eddy coefficient of thermal conductivity

$g$  = gravity

$c_p$  = specific heat

$k$  = molecular thermal conductivity

The assumption is introduced that the ratio  $\frac{q}{\tau}$  will

remain constant across the width of the boundary layer. This is reasonable since the momentum lost in the turbulent layer is that transferred to the laminar layer in the absence of friction, and the heat lost from the turbulent layer is that transmitted through the laminar layer. The reader is referred to Schlichting (1960) for a complete treatment of this development. The end result of the integration and combination of the above equations, (2) and (3), is an expression for the local coefficient of heat transfer across a boundary:

$$\alpha = \frac{gc_p \tau}{\left[1 + \frac{\bar{u}_1}{\bar{U}_\infty} \left(\frac{P}{P_t} - 1\right)\right]} \bar{U}_\infty \quad (4)$$

where:

- $\tau$  = stress in the laminar subboundary layer
- $\bar{U}_\infty$  = average fluid velocity at a great distance from the boundary surface
- $\bar{u}_1$  = average fluid velocity at the top of the laminar subboundary layer
- $P$  = ratio of molecular momentum and thermal transfer coefficients
- $P_t$  = ratio of turbulent momentum and thermal transfer coefficients
- $g$  = gravity
- $c_p$  = specific heat

A basic problem of measurement of the boundary layer stress ( $\tau$ ) remains in equation (4). Simplification of this equation is required before the calculation of  $Qa$  and  $Qw$  can be attempted and used in practical deterioration problems.

### Statistical Approach

Certain simplifications of equation (4) will now be made.  $P_t$  can be set equal to 1, which implies that the turbulent mechanism for the exchange of momentum is the same as that for heat. According to Schlichting (1960), because the boundary velocity and temperature profiles are quite similar, little error will result from this assumption. The Prandtl number  $P$  will equal 1 when dealing with gases, but will differ considerably in liquids. This means that the heat transfer between the air-ice boundary and the water-ice boundary should receive slightly different treatment.

The stress term in the above equation can be further broken down into  $\tau = \frac{\mu d\bar{u}_1}{dy}$ . With  $\bar{u}_1 = 0$  at

the wall, and linearizing the gradient, the equation (4) will now take the form:

$$\alpha = \frac{gc_p \bar{u}_1 \mu}{\left[\bar{U}_\infty + \bar{u}_1 \left(\frac{P}{P_t} - 1\right)\right]} y$$

Now setting  $P=1$  and  $P_t=1$  as stipulated above for the air exposed portion of the berg, the equation evolves down to:

$$\alpha = \frac{gc_p \bar{u}_1 \mu}{\bar{U}_\infty y} \text{ or } \frac{F}{\bar{U}_\infty} \quad (5)$$

with  $F$  being equal to a number made up by gravity, specific heat, viscosity, and the term  $\frac{\bar{u}_1}{y}$  representing the laminar subboundary layer velocity gradient. This gradient is impractical to determine in the field at this time and requires that an empirical approach be attempted. A general expression for heat transfer is:

$$q = \alpha(T_\infty - T_b) \quad (6)$$

where:

- $T_\infty$  = average air temperature at a great distance from the berg
- $T_b$  = surface temperature of the iceberg, assumed to be 0° C.
- $\alpha$  = coefficient of heat transfer

Thus combining equations (5) and (6) the rate of heat transfer per unit area from the air environment to the berg becomes:

$$q = \alpha T_\infty = \frac{T_\infty}{\bar{U}_\infty} F \text{ gm cal/cm}^2/\text{sec} \quad (7)$$

For a water environment the relationship is not as concise because  $P \neq 1$ , therefore

$$\alpha = \frac{gc_p \bar{u}_1 \mu}{[\bar{U}_\infty + \bar{u}_1(P-1)]} y \quad (8)$$

The measurement of  $\bar{U}_\infty$  for water would be very difficult if not impossible. Water movement relative to the berg will be very small in the horizontal and totally negligible when compared to the turbulence caused by the rolling of a berg. Water velocities of several knots are possible as a berg oscillates or rolls in a seaway. This is a variable and depends upon the bergs size stability and the





cause the elimination of one of the terms. For example, in order to solve for  $F$ , a berg must be located in water which is  $0^{\circ}\text{C}$ . or less. This all but eliminates the melting of the underwater portion and allows the dropping of the term containing  $R$  thus allowing the solution for  $F$ . Accurate mass measurements with time must be made in order to determine  $\Delta M_1$ . Conversely, a cold air and warm water environment will allow the determination of  $R$  with the elimination of the  $F$  term.

The known density value will allow computation of total mass and mass change from the measurement of the above the water volume, therefore, only these measurements need be made. By studying many bergs in various environments the values of  $F$  and  $R$  can be determined and the table shown above can be completed. The figures for  $F$  and  $R$  will become more reliable as more bergs are observed.

After  $F$  and  $R$  are characterized, the equation for deterioration time, equation 10, can be modified for practical application. This is done by substituting the total mass ( $M_t$ ) of the berg that must deteriorate above the water (.1  $M_t$ ) and below the water (.9  $M_t$ ) for the  $\Delta M_1$  and  $\Delta M_2$  values respectively. Further simplification of terms of equation (10) gives:

$$G = \frac{.1M_t}{F} \text{ and } S = \frac{.9M_t}{R}$$

thus,

$$D \text{ time} = 0.024 \left[ G \frac{U_{a\infty}}{T_{a\infty}} + \frac{S}{T_{w\infty}} \right]$$

where the  $G$  and  $S$  terms can be precomputed and a table prepared similar to that above for  $F$  and  $R$ . Because the table is already broken down for size, only the estimation or rather the designation of the mass values of the small, medium, and large bergs must be made. These characteristic values for mass are best left to be designated from the size measurements obtained for the determination of  $R$  and  $F$ . The basic approach is to determine the values of  $R$  and  $F$  for many bergs and then attempt to categorize these bergs for mass and size into the types and groups shown above. A more sophisticated breakdown could be employed depending on the direction dictated by the obtained data.

This approach is at best only a start. A better breakdown for size and shape may evolve as the study progresses. A more detailed deterioration

expression cannot be used because of the limitation requirement of minimal data gathering for a particular berg. Thus, this system is presented which would allow deterioration predictions to be made based on data collected by either ships or aircraft without the involvement of scientific personnel.

### Data Collection

During the interval between the first and second current surveys of Ice Patrol 1965, an iceberg was studied for the drift and deterioration rate. Many environmental measurements were made, along with actual size measurements of the berg in an effort to initiate a deterioration study.

Environmental parameters were measured on an hourly basis and are presented in figures 1C through 5C. They include: air temperature, sea surface temperature, barometric pressure, wind direction, wind velocity, wave height, wave direction, and incident solar radiation. The solar radiation was measured continuously and recorded by an Epply pyrheliometer.

Several oceanographic casts were made in the vicinity of the berg during the study period from 27 April to 6 May 1965. The stations occupied can be found in the appendix and include stations 9307 to 9312.

Size measurements of the berg were accomplished daily by a photographic mapping technique. A series of photographs were taken around the berg at approximately  $30^{\circ}$  intervals of arc. This provided photographs covering all sides of the berg. Overlapping pictures of the starting point were made at the completion of the round of photographs and used to estimate the amount of berg rotation during the photographing process. With this knowledge, and assuming uniform rotation, the pictures obtained at the recorded intervals could be adjusted to their true angular aspect. This process is displayed graphically in figure 7C. A sample series of photographs are shown in figures 8C and 9C.

The subject berg had a surface configuration which was characteristic enough to detect the rotation. Provisions were made however to put a dye spot on the berg (figure 10C) to provide a benchmark to detect this motion. For this particular berg, the dye mark was utilized solely to test the various dyes selected for use. The dye Rhodamine B was found to be the most satisfactory and the use of a sporting bow with a glass vial tipped arrow, figure 10C, proved to be a successful means of dye application.



The method of measurement employed the use of an optical rangefinder and a standard navigation sextant. While the distance of the ship from the iceberg was being determined with the rangefinder, certain characteristic elevations of the berg, above the waterline, were being measured with the sextant. The results of these measurements allowed trigonometric computation of certain vertical dimensions which were used as calibration measurements for the round of photographs which were subsequently taken. Several elevation measurements were made on the different parts of the berg and the mean for each characteristic height was used. With each photograph calibrated by one or more measured elevations, other dimensions of the berg could be picked off the various photographs. After each photograph was adjusted for the correct angular aspect, the horizontal widths were measured starting at the waterline and at 25-foot intervals to the top of the berg. Indentations, gaps, and other surface discontinuities were also measured in relation to the centerline as shown in figure 11C. With these measurements, along with a relatively constant distance from the berg for each photograph, a topographic map of the bergs configuration above the water was constructed, as shown in figure 12C. Starting with the waterline, levels at 25-foot intervals were subsequently constructed. The picture measurements provided the widths and distances for the construction of guide points on a plan view of the berg. Once the guide points were established, some artistic work was required to connect the points and fill in the measurement gaps using the photographs for reference. For the accuracies involved, the distance from the berg for pictures taken beyond 400 yards could be considered at infinity because it affected the angle of the constructed tangent lines very little.

Once the scaled mapping was completed, a planimeter was used to compute the areas at each level. These areas were then integrated over the entire height and the total volume above the water was obtained.

Daily measurements were obtained in an effort to observe the changes with time in order to correlate the measured mass reductions with the observed meteorological and oceanographic parameters. Due to the cold conditions existing during the study period, and the apparent slight deterioration, only two volumetric determinations were made. The maps used in these determinations are shown in figure 13C. The amount of

visual change in the berg is displayed in figure 14C showing similar aspect photographs taken at an interval of 10 days.

### Data Correlation

Environmental conditions of the study berg remained relatively constant during the study period. Figures 1C and 4C, the plots of air temperature during part of the study period and the surface water temperatures as measured by the ship's hull probe, show a slight warming tendency of the water. The upper water layers, less than 5 meters, indicate temperatures above 0° C. during the last few days of the study, however, the Nansen cast information indicates that the berg's basic environment was subzero water. This indicated that little subsurface deterioration took place which seems to be substantiated from the size measurements. Looking at figure 14C, calving did occur during the period of study and probably accounted for most of the loss of mass above the water. Little or no correlation with deterioration is seen from the wave height and wave direction observations. As was pointed out in the previous sections, the sea state will cause oscillatory motions of the berg and will contribute to the subsurface turbulence in the bergs vicinity, thus circulating the water and hastening melting in the warmer environments. Wind velocity and direction during the study period are shown in figure 2C.

Calculations based on the topographic maps constructed from the berg's measurements provide the volume of the above-the-water portion of the berg. The total mass of the iceberg may be obtained using the iceberg's density and the total volume determination. Smith (1931) has made actual measurements of iceberg density. He shows a figure of 0.8997 gm/cm<sup>3</sup> as a mean. Due to the contained air, this density value will vary from berg to berg and within different parts of the berg. However the density variation will be within relatively narrow limits and the figure 0.9 gm/cm<sup>3</sup> will be sufficiently accurate in comparison to the accuracy in size determination. Using Archimedes flotation principle the mass of the iceberg can be calculated as follows:

$$\begin{aligned} &\text{Percent of ice below the water} \\ &= \frac{\text{density of berg}}{\text{density of sea water}} \\ &\text{Total berg volume} \\ &= \frac{\text{volume above the water}}{\text{percent of total volume above the water}} \end{aligned}$$

Total berg mass = total berg volume  $\times$  berg density  
 These calculations were performed for the study  
 berg and the tabulated results are shown below

#### 28 April

Volume	Mass
707,300m <sup>3</sup>	636,570 $\times$ 10 <sup>3</sup> kg.

#### 6 May

Volume	Mass
624,200m <sup>3</sup>	561,780 $\times$ 10 <sup>3</sup> kg.

The above calculations determine that a change of 12 percent took place over an 8-day period. The accuracy of these calculations is based on the accuracy of measurement and the precision of construction of the topographic map of the berg. Because a good deal of artwork is involved, the precision of construction probably contributes most of the error. For this reason, the work done on size measurements performed this year are believed to have a probable error of 5 percent and could be as high as 10 percent. Because of this, and the small mass change, more frequent topographic maps were not prepared.

Referring to the statistical approach, this study berg is difficult to categorize. The air temperatures are cold showing a mean of about 1.1° C. with a general rise to a maximum of 5° C. towards the end of the survey. This air temperature rise is reflected in the sea water temperature at the surface. In order to determine the deterioration constants *S* or *G*, the melting of the berg above the water and below the water must be

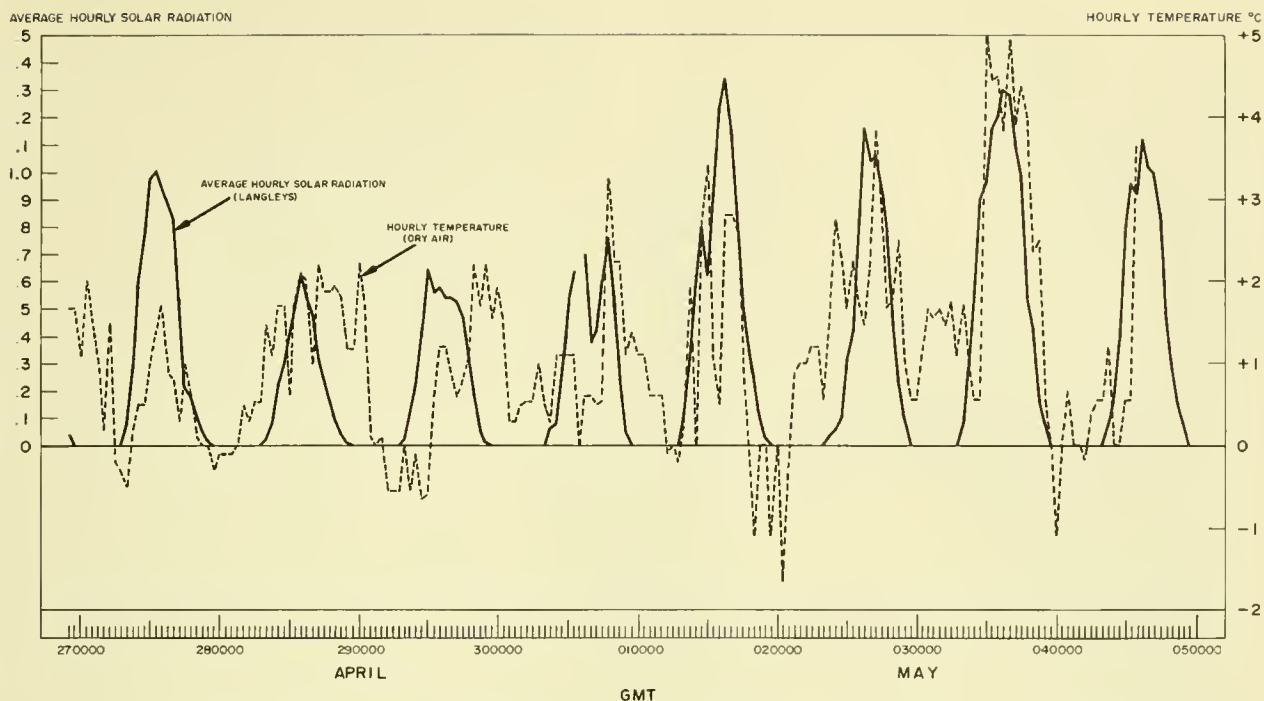
quantitatively tagged. As pointed out in the previous sections, this can only be done by eliminating one of the melting environments, i.e., obtain a berg in a cold water, warm air or warm water, cold air environment. Unfortunately, this study berg falls into a cold water, cold air category where little deterioration can occur. The water is as cold as can be expected any time of the year and the air is only slightly above freezing, but the berg did change its mass 12 percent in 8 days. As the berg deteriorates its overall surface area will be reduced. If environmental conditions are held constant and similar to the first 8 days, the observed volume loss of  $1.04 \times 10^4$  m<sup>3</sup>/day would diminish due to a diminished surface area for heat transfer. However, if it is assumed that in the extreme case this rate will remain constant, a minimum of 70 days would be required for this berg to deteriorate. The true situation is that because of the reduced surface area and therefore reduced heat transfer much longer would be required to melt the berg. This berg would be considered as nondeteriorating in terms of significant changes over a 1- or 2-week period. It is therefore impossible to tag the cause of the observed limited deterioration or to calculate either of the deterioration constants relating to the air or water environment.

The study conducted did demonstrate that more severe differences must exist in the bergs environment to allow computation of the desired constants. It also provided for the development and improvement of the mapping technique employed.

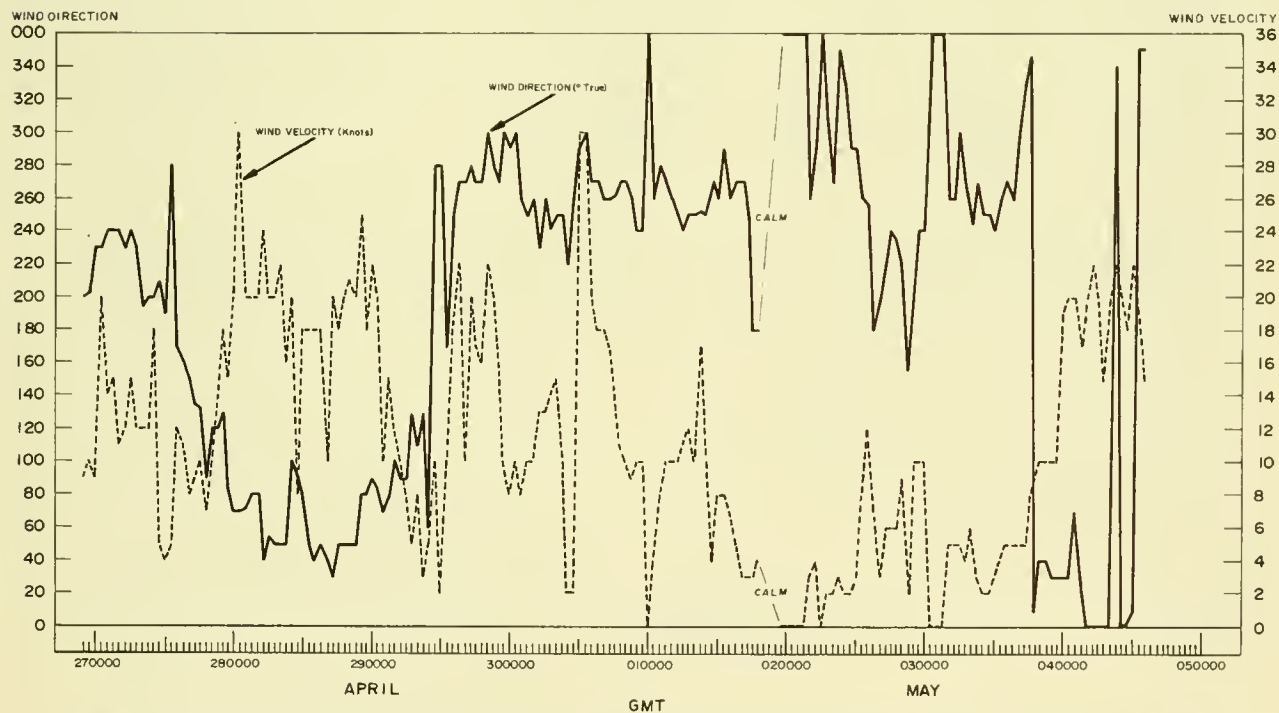
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**Figure 1C.** Average hourly incident solar radiation and hourly dry-bulb air temperature observed during the iceberg study 26 April-6 May 1965.

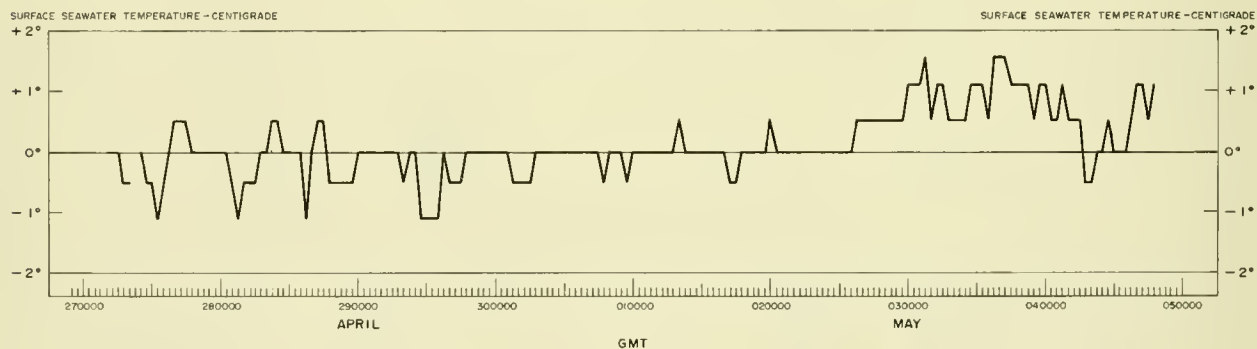


**Figure 2C.** Hourly true wind direction and velocity observed during the iceberg study 26 April-6 May 1965.





**Figure 3C.** Hourly true wave direction and significant wave height observed during the iceberg study 26 April-6 May 1965.



**Figure 4C.** Hourly seawater surface temperature observed during the iceberg study 26 April-6 May 1965.



**Figure 5C.** Hourly barometric pressure observed during the iceberg study 26 April-6 May 1965.



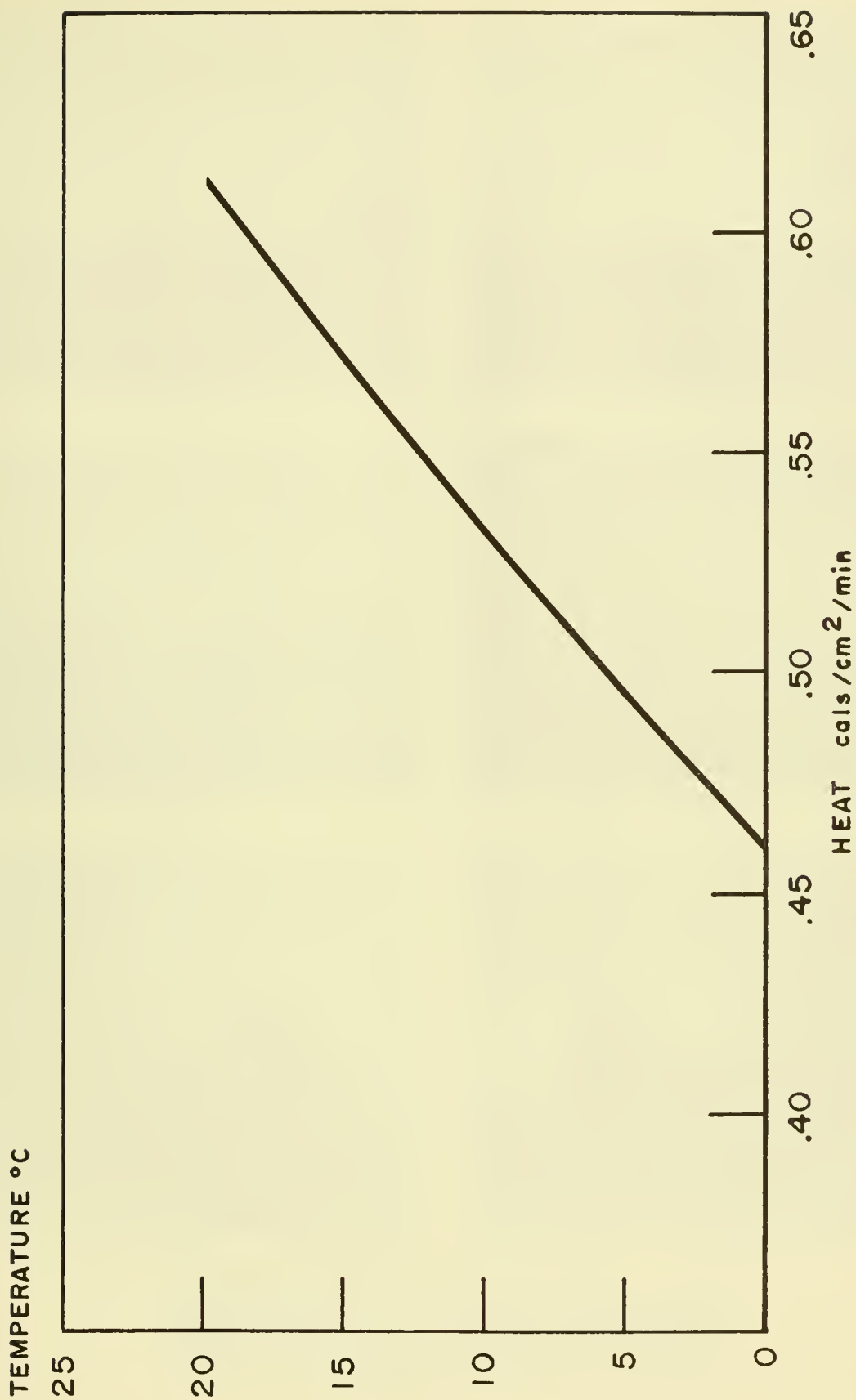
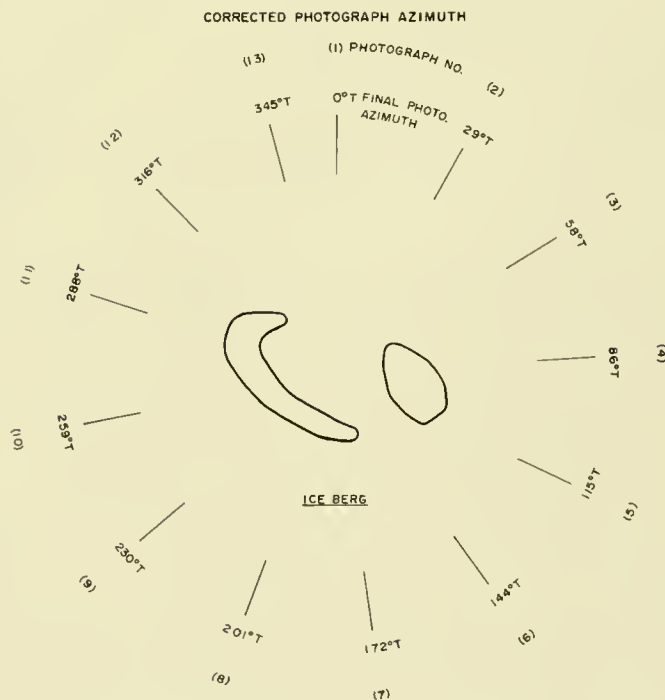
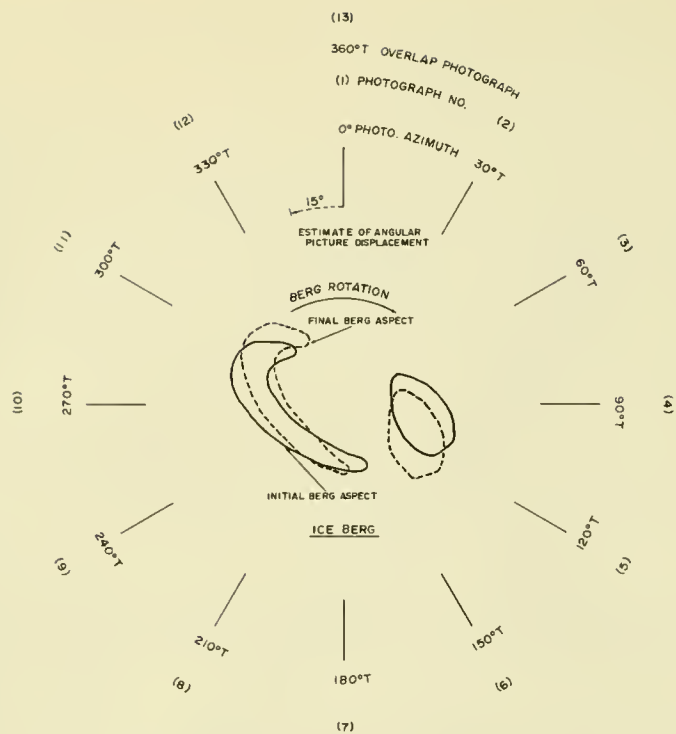


Figure 6C. Blackbody heat radiation for temperatures between 0° C. and 20° C. Based on the Stefan-Boltzman radiation law.



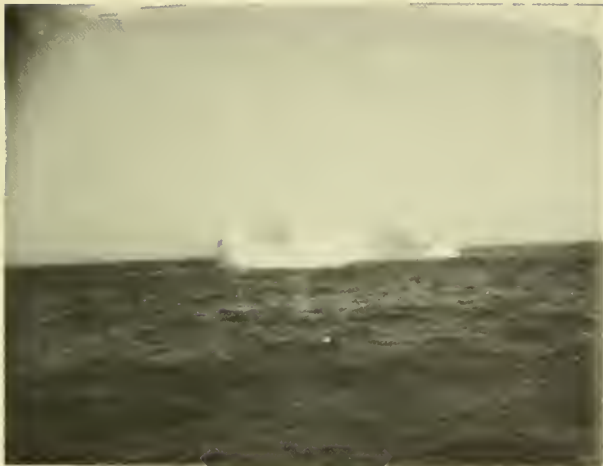
**Figure 7C. (Upper drawing) Plan view of iceberg waterline showing initial and final berg aspect at the commencement and termination of a round of photographs. (Lower drawing) True photograph azimuth after angular compensation for berg rotation during round of photographs.**



290°T



320°T



350°T



020°T



055°T



110°T

*Figure 8C. Sample round of iceberg photographs starting from 290° T. (See next figure.)*



140°T



170°T



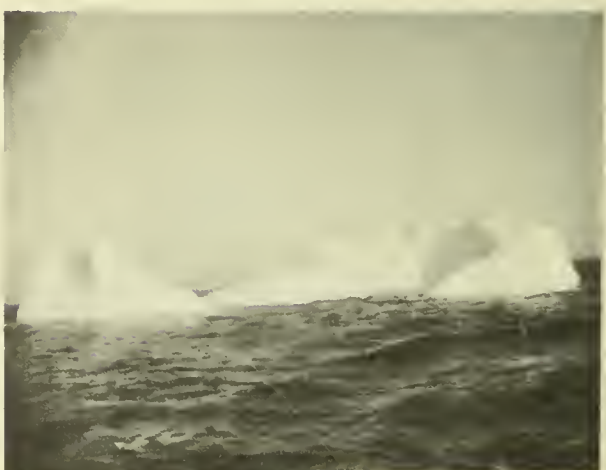
200°T



240°T



260°T



290° (overlap)

Figure 9C. Sample round of iceberg photographs (continued from previous figure). Photograph repeated at 290° T (overlap) shows berg rotation during period of photographs.



a



b



c



d

**Figure 10C.** Dye spots on iceberg, close up picture (a); at distance picture (b), circled for clarity. Bow and glass tipped arrow used in dye application, picture (c); archer in action, picture (d).



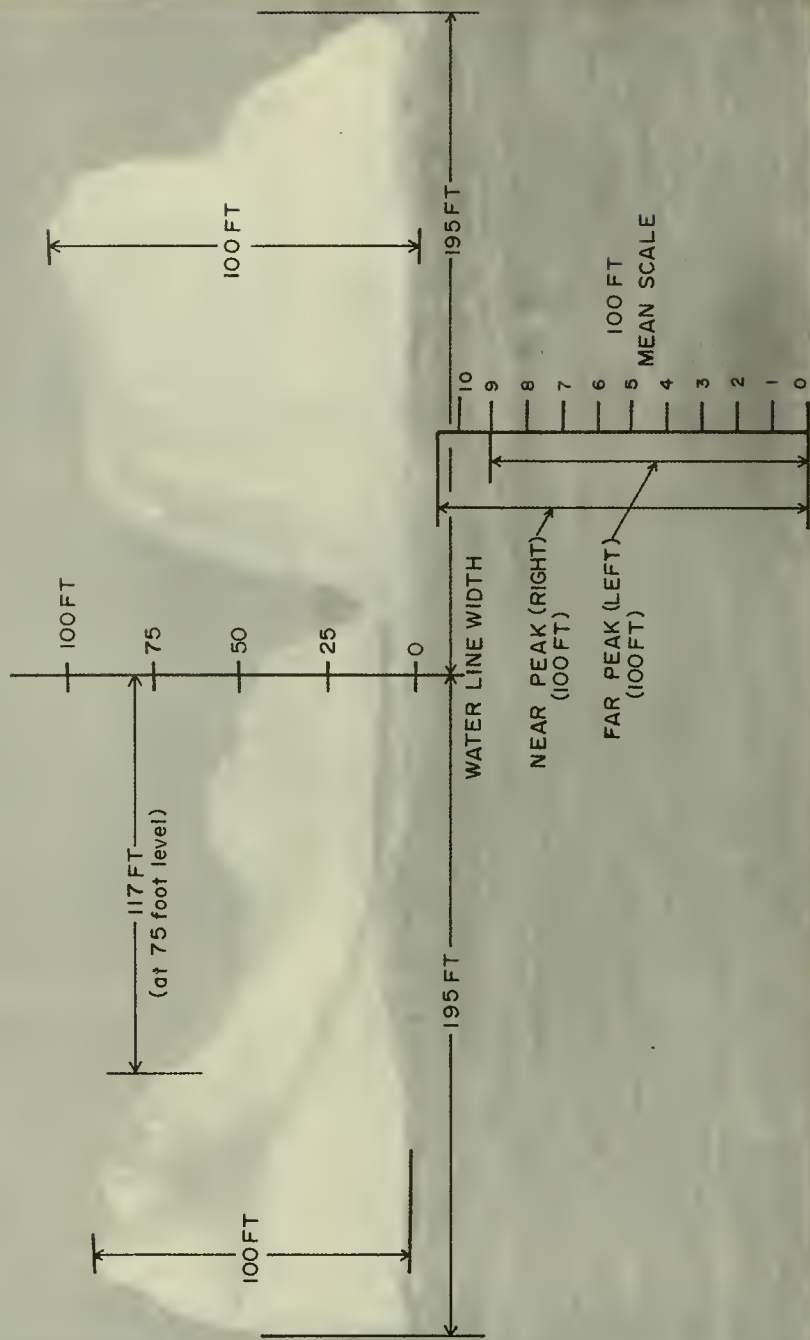


Figure 11C. Measurement technique employed on each photograph using prominent elevations as reference heights. Mean reference height is established as shown by considering perspective.

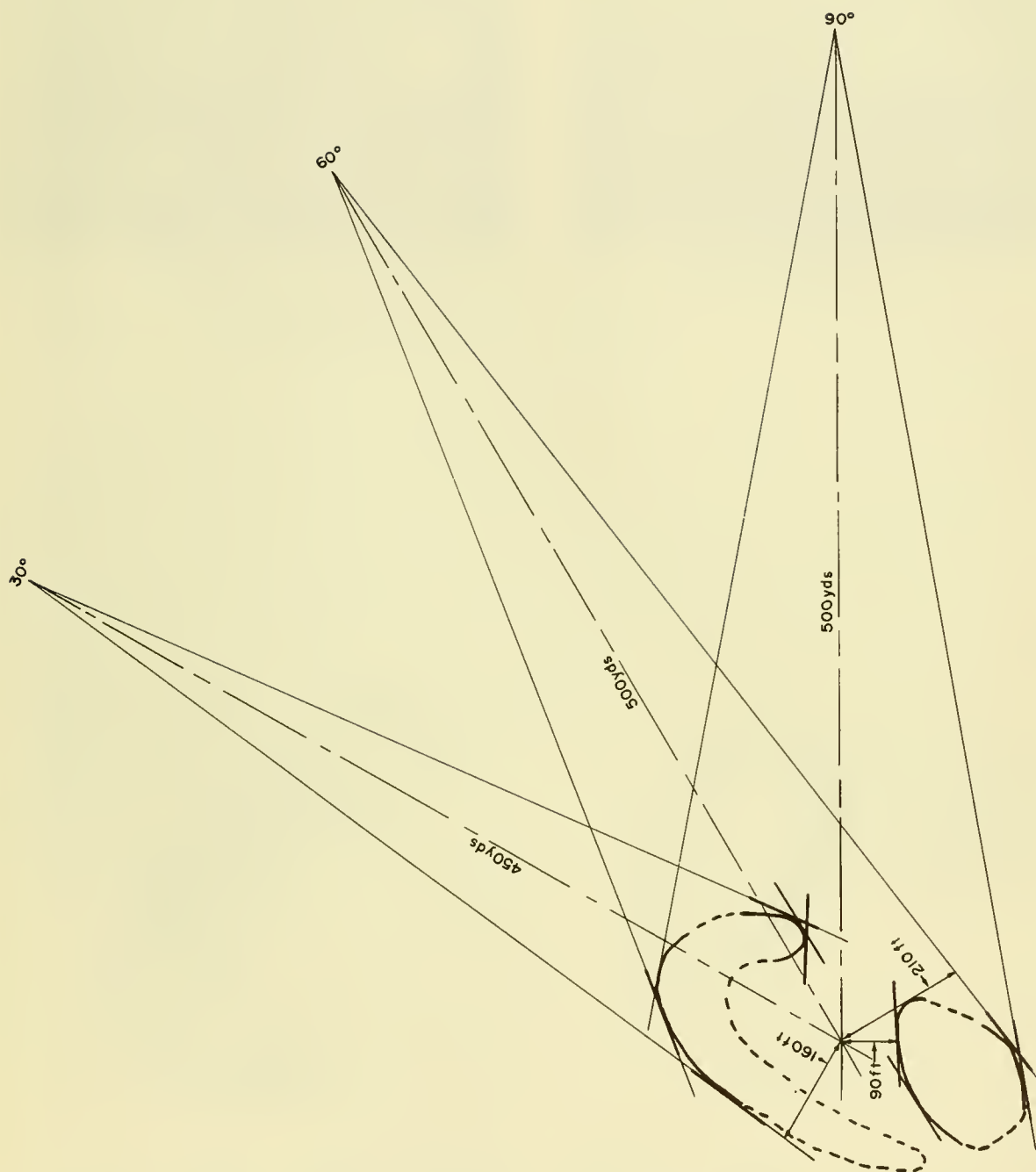


Figure 12C. Method of topographic map construction based on measurements from photographs, azimuth, and distance from berg.

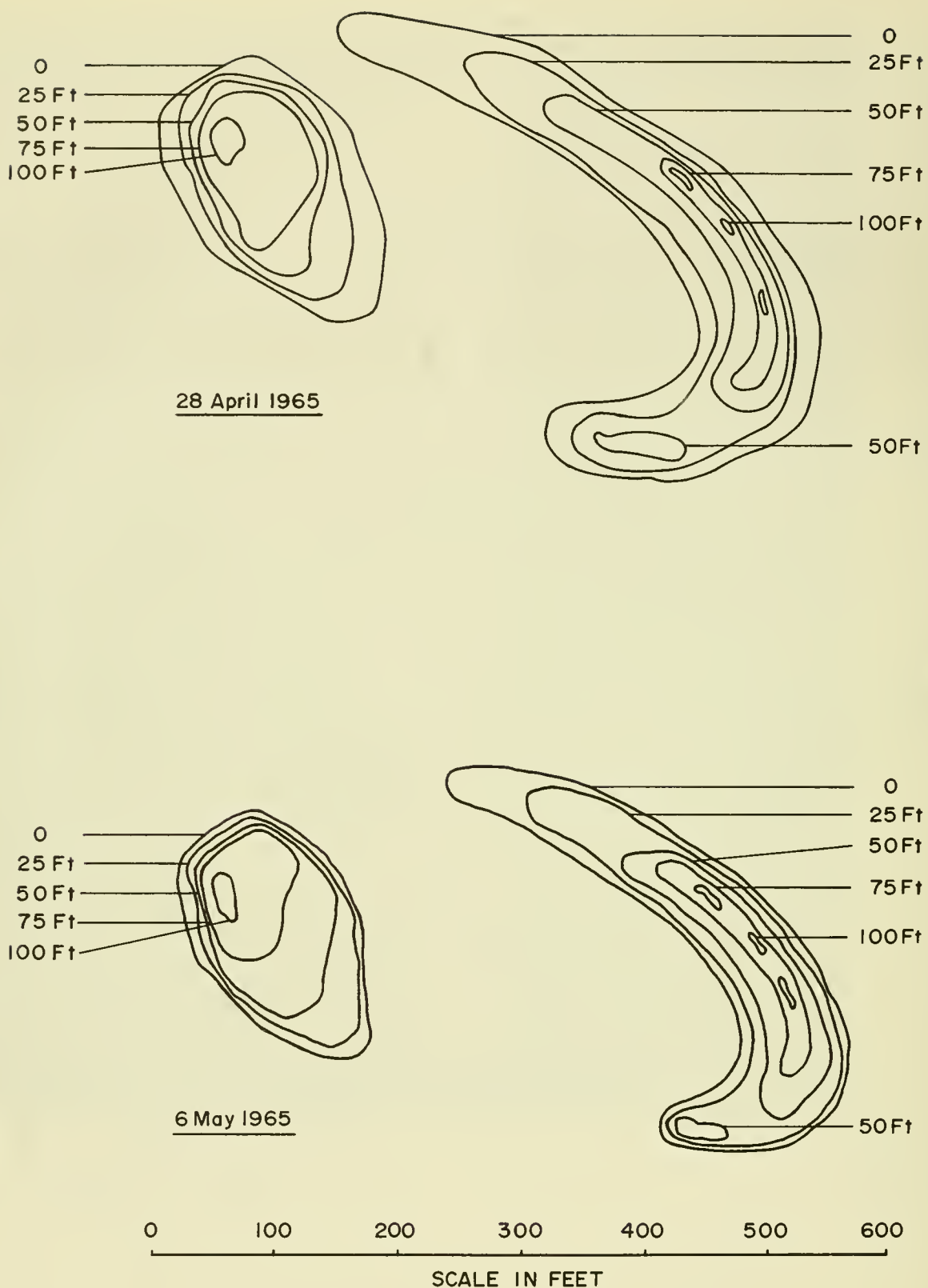


Figure 13C. Completed topographic iceberg map used for measurement of berg volume above the water. Upper map based on observations obtained at commencement of study 28 April 1965 and lower map based on observations obtained at the termination of the study 6 May 1965.



*Figure 14C.* Similar aspect iceberg photographs showing wastage during the study period. Left photograph was taken on 26 April 1965, right photograph on 6 May 1965.

**TABLE IC. Estimated deterioration time in days for icebergs**

Sea water temperature	Small berg under 50' high, less than 200' long	Medium berg 50'-150' high, 200'-400' long	Large berg over 150' high, over 400' long
	<i>Days</i>	<i>Days</i>	<i>Days</i>
32-----	15	40	90
36-----	8	16	35
40-----	5	10	20



# An Examination of Vertical Sampling Methods and Their Influence on Dynamic Height Calculations

by

RONALD C. KOLLMAYER, *U.S. Coast Guard*

## Introduction

The primary objective of the Ice Patrol surveys is to gather dynamic height information on the Labrador Current and Gulf Stream off the Grand Banks of Newfoundland for the purpose of predicting iceberg drift from geostrophic current maps. Dynamic heights are calculated from temperature and salinity measurements of the water at various depths.

For 35 years Ice Patrol surveys have sampled temperature and salinity at standard depths of 0, 25, 50, 75, 100, 150, 200, 300, 400, 600, 800, 1,000, and 1,500 meters. This standard sampling system is a compromise between the ideal of continuous vertical water column values on the one hand, and the practical necessity of rapid survey with a minimum quantity of samples on the other.

A greater economy of effort and equipment, and more reliable oceanographic inferences, could be obtained if gradient depths (i.e., depths of sharp water property change) were known prior to attaching Nansen bottles to the wire. The intervals between bottles would then be set to assure that no important changes were missed, and that depths of changes were more accurately determined. Toward this end an electronic bathythermograph with a depth limit of 410 meters was used during Ice Patrol 1965 to provide information critical to the spacing of Nansen bottles. This gradient sampling method is compared to the standard sampling method herein, in an attempt to determine their merits and failings.

A continuous sampling device which gives a very great or unlimited number of data points such as to provide an unbroken record of temperature and salinity through the entire column is ideal, eliminating problems arising from Nansen bottle spacing altogether. The measurement accuracies of such a device, as they apply to dynamic

height calculation, was examined and the results comprise the latter part of this paper.

## Sampling Methods

Analysis of the waters off the Grand Banks discloses that this area has some of the most unusual variation in vertical distribution of water properties in the world. With the Labrador Current running parallel to the Gulf Stream in some areas and sinking beneath it in other locations, vertical changes in temperature and salinity are quite severe over short distances. Figures 1D, 2D and 3D show examples of temperature and salinity distribution of water columns down to 1,000 meters as determined from data obtained during Ice Patrol 1965.

Designing an adequate sampling program for water masses such as shown presents a problem. Since great changes in the vertical distribution of temperature and salinity occur at various levels for different stations, a fixed point sampling program will frequently miss critical maximum and minimum points in the property distribution. An example of this is demonstrated in figure 2D where the extreme values would have been missed by the standard sampling points shown above. Conversely, many Ice Patrol areas are very uniform, as shown in figure 4D, where using even a small number of Nansen bottles would suffice.

During Ice Patrol 1965, a gradient sampling approach was used. This method allows the positioning of Nansen bottles to be based on the results of a preliminary bathythermograph drop at each station. A Hytech Electronic Bathythermograph, Model 480 MOD 1 with a modified sensing fish was used to determine the temperature structure down to 410 meters, the limiting depth of the instrument. Thus a more complete description of the temperature distribution will be obtained by reversing thermometers and if a stable water column is assumed the variation of salinity with

depth will be adequately described. Past Ice Patrol data indicate stable water columns below 100 meters are the rule.

Ice Patrol requirements are better fulfilled by the gradient sampling method. First, better temperature-salinity information is obtained for the dynamic height calculations required for surface current determinations and, second, a more accurate picture of the vertical variations of temperature is described for tracing and analysis of the Labrador Current. As an added feature to this method, it is noted from figure 4D that many areas of the Grand Banks are quite uniform in their property distribution allowing fewer Nansen bottles than usual to be used on a cast, thus decreasing time on station, reducing data processing time, and risking less equipment. This is illustrated by Table ID, where each station on two of the surveys of 1965 is compared for the number of bottles used with the standard depth and the gradient sampling methods.

The advantage of the gradient sampling method lies in the obtaining of better definition of the property distribution. With a more accurate description of the temperature and salinity structure, the accuracy of the dynamic height calculations will also improve. To show this, a standard model of the temperature and salinity structure for each station taken during the first and third surveys was prepared. All observed data points obtained from the gradient sampling method were used to provide a graphic plot of temperature and salinity versus depth. Supplemental temperatures were gleaned from the bathythermograph records and along with the observed data were plotted on H.O. 17325 temperature-salinity-density paper. Corresponding supplemental salinities were then obtained for an assumed stable water column. The resulting composite temperature-depth and salinity-depth plots are certainly a close approach to describing the properties of each water column. Figure 5D shows an example of a property distribution plot based on observed values from Nansen bottles and the bathythermograph supplemental points.

The dynamic heights based on observed gradient sampling values were computed immediately during the survey. Later, a second set of points representing the temperature and salinity values at the standard Ice Patrol depths were abstracted from the composite distribution curves to 1,000 meters and processed on the computer for dynamic heights. Figure 6D shows what the property

distribution would look like if this water mass had been sampled using the standard Ice Patrol depths only. Although the density distribution is adequately described, in figure 6D, important temperature and salinity distribution detail is lacking. A third set of points representing any significant change in temperature and salinity with depth were abstracted from the curves and processed by the computer. This third set of points was sufficient to adequately describe the distribution of temperature and salinity and the resulting dynamic height is considered the closest approach to the true value. Figure 5D, shows an example of the vertical distribution of these 3 sets of computer processed points: the observed Nansen bottle points, abstracted standard depth points, and abstracted true points.

Table IID shows the comparison between the surface dynamic heights of the two sampling methods and the true value. It can be seen that both methods give results quite close to the true dynamic height value of the station with the gradient method giving slightly better results; standard deviations are  $\sigma = \pm 0.0039$  DM for gradient sampling and  $\sigma = \pm 0.0052$  DM for standard sampling. These values are for all 119 stations taken on the first and third surveys of Ice Patrol. These stations were taken both on and off the Grand Banks and include shallow stations where the cumulative errors are minimal in many cases. A total of 62 stations were taken in water greater than 1,000 meters, the assumed depth of no motion, and a more realistic comparison is shown from these;  $\sigma = \pm 0.0044$  DM for gradient sampling, and  $\sigma = \pm 0.0065$  DM for standard sampling. The gradient method is, however, head and shoulders above standard sampling because the extreme temperature values obtained more accurately describe the existing distribution. These values are essential for the proper analysis and interpretation of the water masses of the Ice Patrol area. Table IID also presents the maximum differences from the true value. In the case of gradient sampling, a large difference occurred due to the missing of gradients caused by encountering a greater than anticipated wire angle.

The errors listed above for the gradient sampling method and the standard depth method can significantly influence the calculated current. The influence is dependent upon the station spacing and the current velocity. In figure 7D, station interval is plotted against calculated current



error at 45° North latitude. The two curves reflect a total error between 2 stations of 0.0088 DM for gradient sampling and 0.0130 DM for standard depth sampling. For stations 10 miles apart, the standard depth sampling method can cause an error of up to 6.8 cm/sec or about one-tenth of a knot. In some low current areas, the velocity of the surface current could be of this magnitude resulting in a 100-percent error factor. The gradient sampling error is slightly better, showing a 4.6 cm/sec possible error. These current velocity errors do not reflect any instrument measurement error which could add more than 0.01 DM of error to dynamic height calculations.

The close comparison between the dynamic heights determined from standard depth sampling and gradient sampling indicates that the vertical distribution of temperature and salinity at a number of stations does not have to be completely described in detail in order to do dynamic calculations for the sea surface. A plot of the specific volume anomaly ( $\delta$ ) versus depth is, in general, quite uniform with only gradually changing gradients. In many cases only a few data points in the water column are required to draw a curve which describes the mass distribution. Due to the regularity of change of the anomaly curve within a stable water mass, the trapezoidal rule employed in the numerical integration of a water column for dynamic heights will give satisfactory answers in many cases from a curve constructed with only a few points. As an example, figure 8D shows large alternating changes of temperature and salinity with depth; however, the specific volume anomaly versus depth curve is extremely regular, indicating that this particular water column could have been sampled by almost any method and with a minimum of data points for the determination of the surface dynamics. However, some stable water columns do not have so smooth a curve and many sample points would be necessary for an adequate description.

For Ice Patrol survey work, dynamic height information and a complete description of temperature and salinity distribution must be obtained quickly. These two aims require two different sampling techniques: first, only a few data points critically located and rapidly obtained are needed in any given water column for the adequate determination of dynamic heights based on a smooth curve (the exact number of samples

required needs further study because it depends on the water mass involved); second, a detailed description of the properties requiring a great number of point samples which is virtually prohibitive from the synoptic standpoint. In this situation the ultimate solution is attainable only with a continuous sampling device. A sampler such as this could be lowered in a water column and provide as many data points as considered necessary to fulfill both requirements of Ice Patrol surveys along with adding to the rapidity with which a survey can be conducted.

The state of the art in the field of electronic continuous samplers leaves much to be desired. Whereas the point sampling technique using Nansen bottles and reversing thermometers can miss maximum-minimum temperature information and also fail to describe the gradients of density exactly, the inherent inaccuracies of a continuous sampler also pose a problem.

In using a continuous sampler for the accomplishment of Ice Patrol survey aims the data abstracted from its output must be sufficiently accurate to perform dynamic height calculations. Basically, two causes of error must be considered when comparing the final results of the point (Nansen bottles) versus continuous sampling systems:

- (a) missed density gradients
- (b) instrument accuracy

As discussed above, a good approach to the true dynamic height of a water column can be made from several data points and a smooth drawn anomaly curve. This method could give accuracies to within  $\pm 2$  dynamic centimeters or better depending on the water column. However, the possibility of missing the gradients still exists and generally the missed gradient error must be minimized because of additional instrument errors that must be considered in any sampling system.

In general, with a fixed number of samples of the vertical distribution of some property, the error in describing the distribution by point sample and using straight line integration between these points for dynamic computations is shown in figure 9D and given by the relationship:

$$\text{error} = \frac{\text{change of property gradient}}{\text{fixed number of samples over given distance}}$$

where the change of gradient of some property ( $P$ ) is  $\frac{d^2 P}{dD^2}$ , and the fixed number of samples ( $n$ ) over a given distance is defined by  $\frac{n}{D}$ . At the limit

condition,  $\frac{d^2P}{dD^2} \longrightarrow 0$ , any  $\frac{n}{D}$  will suffice to give 0 error. However as the second derivative of a distribution curve segment increases, the error also increases if  $\frac{n}{D}$  remains the same. If  $\frac{n}{D}$  is allowed to vary with the second derivative, the error resultant can be held constant. The error can be held constant or minimized when using a continuous sampler by abstracting sufficient data points in the areas of greatest property change; or at close spaced uniform intervals over the entire water column, therefore, making  $\frac{n}{D}$  large enough to handle any gradient change. Predicting density gradient changes directly from the temperature and salinity data is difficult; therefore the abstracting of closely spaced uniform interval data points would be the superior method.

An approach was made to this problem by using gradient sampling in an effort to properly describe the density distribution and catch the important changes in gradient. However it was found that the areas of greatest temperature variations are not necessarily the areas of greatest variations in density gradient. On the contrary, figure 8D shows great variations with depth of both temperature and salinity in the upper 200 meters but almost a straight line distribution of density. On the other hand, between 400 and 600 meters, the temperature and salinity gradients are almost vertical while the density gradient is about half of the slope observed in the upper 200 meters where great temperature and salinity variations existed. Past practice has been to sample these deeper levels more sparsely because of the less acute changes exhibited by temperature and salinity, however, this could lead to anomaly errors. Figures 10D and 11D show examples of intermediate level density gradients missed by the standard sampling.

In order to compare the point sampling method with that of a continuous sampler, an approach similar to that used for comparing gradient sampling with standard depth sampling was utilized. Stations representing the various water types found in the Ice Patrol area were plotted to provide vertical temperature and salinity distribution curves as described above. Several of these stations were then processed for the anomaly of specific volume and this was plotted against depth with smooth curves drawn between the points. Then straight lines were drawn between the

standard Ice Patrol sampling depths. By past methods, the values at the standard depths would have been numerically integrated linearizing the data between each standard depth. The areas bounded by the curve of the specific volume anomaly and the straight lines between the standard sampling levels represent the errors introduced in the dynamic height calculations by standard level, fixed sample number method of data collection. This error was then measured by use of a planimeter to obtain the area bounded by the curves which represents the integration error between each depth interval (figure 12D). Table IIID lists the results of this analysis giving the errors, plus or minus, on either side of the idealized distribution curve.

Because of the random character of the anomaly distribution curve, the accumulated errors tend to cancel each other and reduce the totals in most cases. The trend of the curves is towards the more gradual anomaly change with depth resulting in an error which is positive or greater than the true value. Although the accumulated error represents the probable error of standard depth sampling, it is obvious that from the several stations so analyzed that the error ranges from small to large depending on positive or negative error values along the curve. Only 15 stations were selected for this treatment so statistical treatment is not very effective, however, the station distribution is an example of the variety of water masses found in the survey area.

It is attempted herein to show the conditions that can exist and how great the errors can be. Each water column exhibits a random distribution of standard sampling depth errors and a truly representative error is difficult to define. Table IIID indicates what can be expected by insufficiently describing the gradient of density and basing dynamic height computations on the straight line distribution between points. These figures are comparable to the errors determined by standard level sampling versus gradient sampling shown above.

### Continuous Sampling Devices

A continuous sampling system which gives an unlimited number of points would be the ultimate solution to the problem of calculating dynamic heights with a minimum of gradient errors. The advantages of a continuous sampling system can be offset to a greater or lesser extent by the in-



ability of the instrument to measure water properties with sufficient accuracy.

The continuous sampling devices that are available on the market today provide a measurement accuracy from  $0.01^{\circ}\text{C}$ . to  $0.05^{\circ}\text{C}$ . in temperature and about  $0.03\text{‰}$  in salinity. Kollmeyer (1964) pointed out that errors of  $\pm 0.02^{\circ}\text{C}$ . and  $0.02\text{‰}$  can, under some circumstances, result in a maximum possible error of 0.0169 dynamic meters in 1,000 meters. To evaluate the final accuracies in dynamic heights obtained from a continuous sampler, a more realistic analysis is required here. A selected group of stations, some of which were used in the comparative anomaly plots above, were processed several additional times on the computer using different error values of temperature and salinity. The errors used were designed to be additive therefore increasing the anomaly of specific volume and giving a maximum error. As mentioned above, there were a great number of points used such that they do approach the concept of continuous samples. The results are shown in table IVD, with errors given in dynamic meters difference from the true values.

The instrument error is also present when using Nansen bottles and reversing thermometers. Whitney (1957) indicates that accuracies of  $\pm 0.024^{\circ}\text{C}$ . for  $0.05^{\circ}\text{C}$ . scale graduations and  $\pm 0.036^{\circ}\text{C}$ . for  $0.1^{\circ}\text{C}$ . graduations can be expected, and Kollmeyer (1964) indicates  $\pm 0.01^{\circ}\text{C}$ . and  $\pm 0.02^{\circ}\text{C}$ . respectively. During Ice Patrol 1965 some 813 thermometer comparisons were made during the surveys. Each Nansen bottle contained two thermometers with the accepted temperature value being the average figure except in cases of obvious malfunction. Since the true value of the temperature is not known, the error in these thermometer readings can be represented by the standard deviation of each thermometer from its paired average. Table VD shows this deviation for each survey during the 1965 Ice Patrol season giving the largest 95-percent confidence limit of  $\pm 0.016^{\circ}\text{C}$ . obtained during the third survey. An analysis conducted this year on Ice Patrol between two different inductive salinometers, Industrial Instruments Model RS-7A and Hytech Model 6210 using 3 different operators and duplicate bottled salinity samples yielded a standard deviation between duplicate samples of  $0.007\text{‰}$  over 41 comparisons. This gives a 95-percent confidence limit of  $0.014\text{‰}$  for a laboratory salinometer at sea.

From table IVD it can be seen that the average of the maximum instrument error in dynamic heights over 1,000 meters for point sampling is  $\pm 0.0124$  DM using measurement accuracies of  $\pm 0.016^{\circ}\text{C}$ . and  $\pm 0.014\text{‰}$ . The average of the maximum instrument error for a continuous sampler ranges from  $\pm 0.0234$  DM to  $\pm 0.0286$  DM over measurement accuracies of  $\pm 0.01^{\circ}\text{C}$ . and  $\pm 0.05^{\circ}\text{C}$ . respectively and with a salinity error of  $\pm 0.03\text{‰}$ . It is obvious that the errors from both instruments suites will be random, tending to result in a bell-shaped distribution curve with the maximum errors of table IVD as its practical end points. With this assumption it is then possible to compute the  $2\sigma$  or 95-percent confidence limit of measurement accuracy for these dynamic heights. Table IVD also lists this  $2\sigma$  value.

It can be observed from table IVD that the greatest dynamic height error contribution is from the salinity measurement error which is about five times as great as the error in temperature measurement. A temperature measurement error of  $\pm 0.05^{\circ}\text{C}$ . only accounts for about 0.005 dynamic meters while a salinity measurement error of  $\pm 0.03\text{‰}$  accounts for about 0.025 dynamic meters over 1,000 meters.

In order to evaluate the accuracy of a continuous sampler versus the Nansen bottle point sampling method for dynamic height calculations, the errors must be considered as follows: Total error ( $\delta$ ) = instrument error ( $\delta i$ ) + missed gradient error ( $\delta g$ ).

The total error for the continuous sampler falls within a range of  $\pm 0.0231$  DM to  $\pm 0.0282$  DM, depending on the temperature error, and using the average 95-percent confidence figures for instrument error from table IVD and a missed gradient error of 0. For point sampling, the missed gradient error value is so variable and dependent on the water mass and density gradient levels that it is difficult to assign a fixed error, however, from the comparisons of the fixed sampling method and the gradient sampling method presented herein, it has been shown that over 1,000 meters of integration, the 95-percent confidence limit of point sampling error is  $\pm 0.0133$  DM due to missed gradients. Using this figure and the average 95-percent confidence limit instrument error of  $\pm 0.0122$  DM from table IVD for Nansen bottles, the error resulting from the use of standard depth point sampling is equal to

$\pm 0.0255$  DM. By comparing this figure with that of the greatest continuous sampler error of  $\pm 0.0282$  DM shown above, it is concluded that both systems give comparable results insofar as

dynamic height calculations are concerned with the continuous sampler providing a much more complete description of the temperature and salinity distribution.

## REFERENCES

Kollmeyer, Ronald C. (1964). An Examination of Errors in Dynamic Height Determinations. U.S. Coast Guard. Unpublished manuscript, series, October 1963.

Whitney, G. G., Jr. (1957). Factors Affecting the Accuracy of Thermometric Depth Determination. *Journal du Conseil*, vol. XXII, No. 2, pp. 167-173.

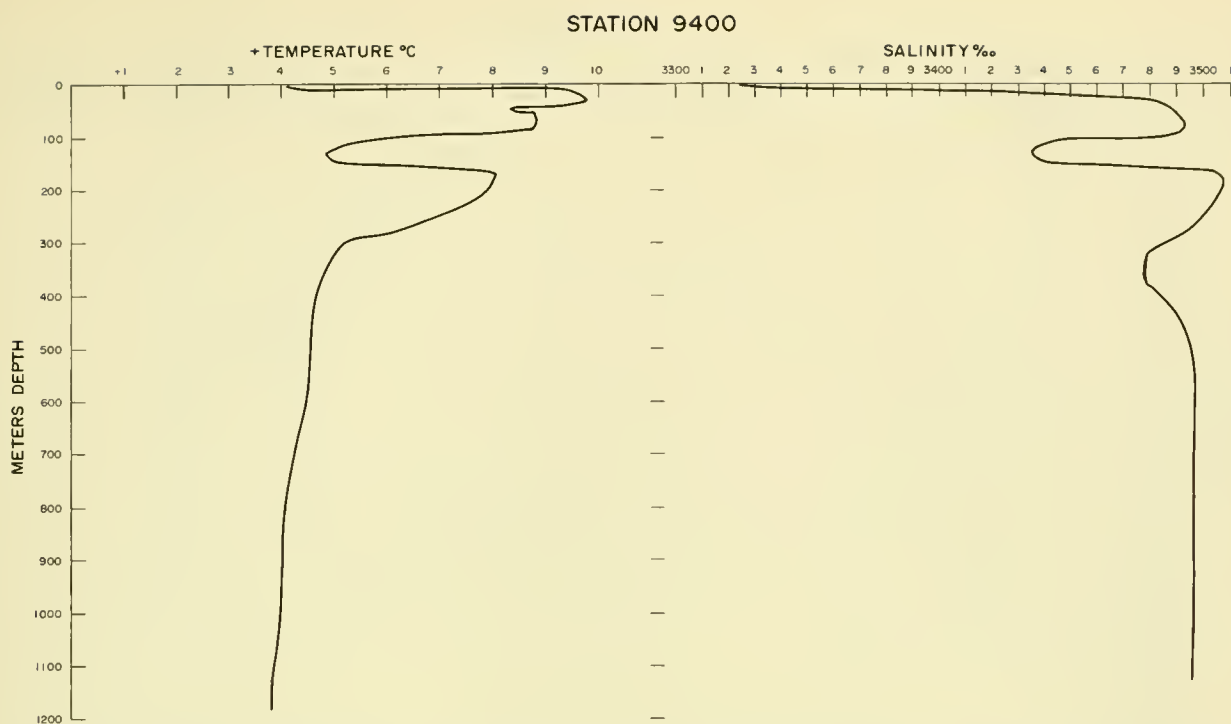


Figure 1D. Vertical distribution of temperature and salinity for station 9400 based on observed data points.

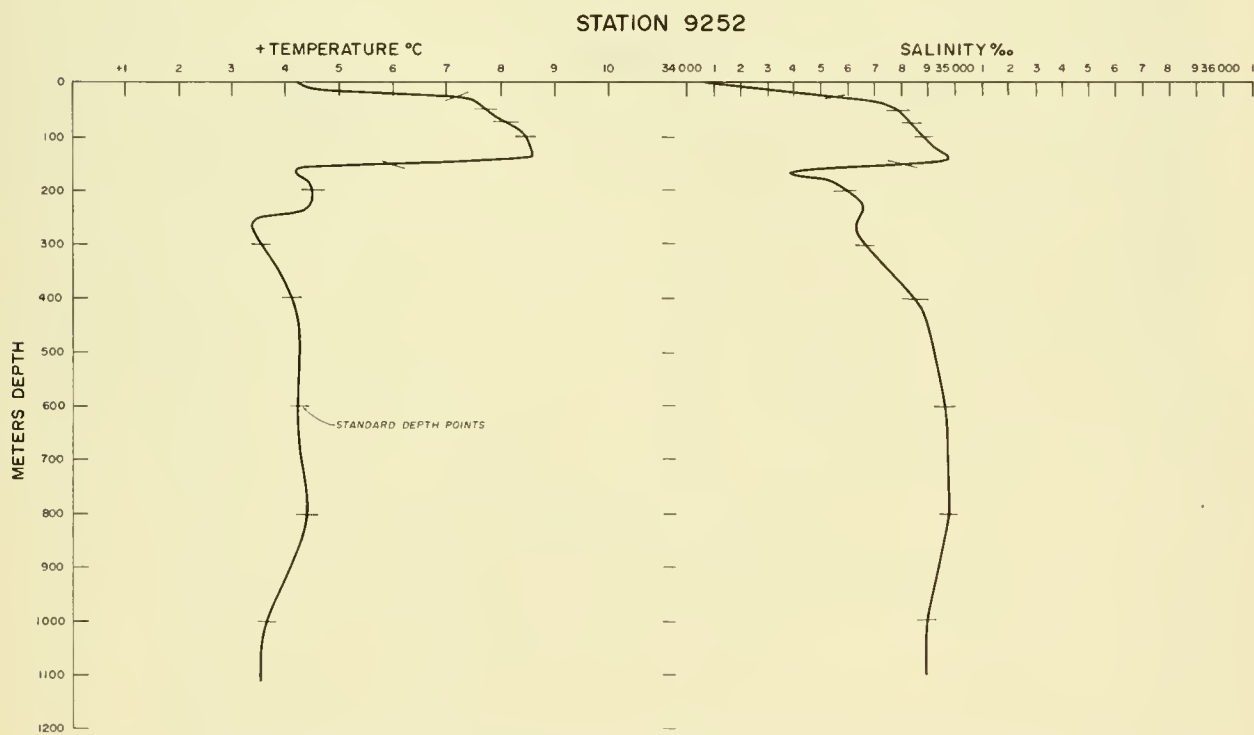
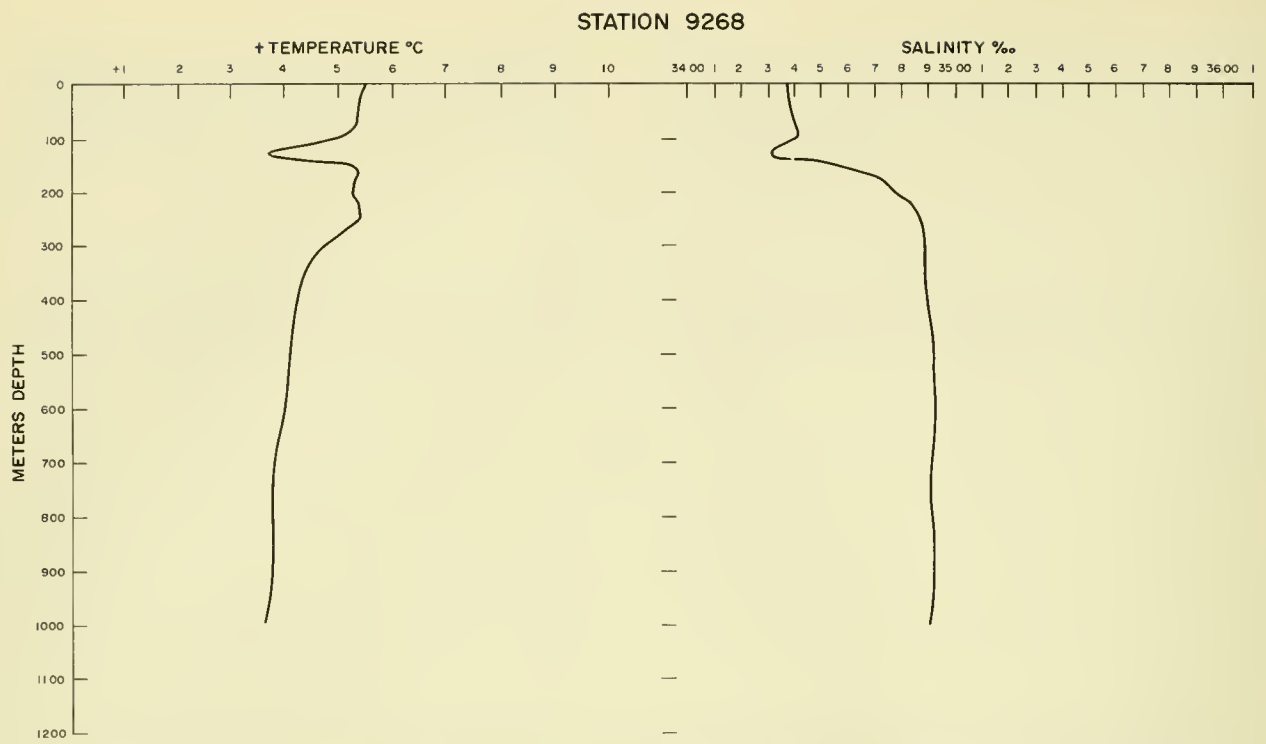
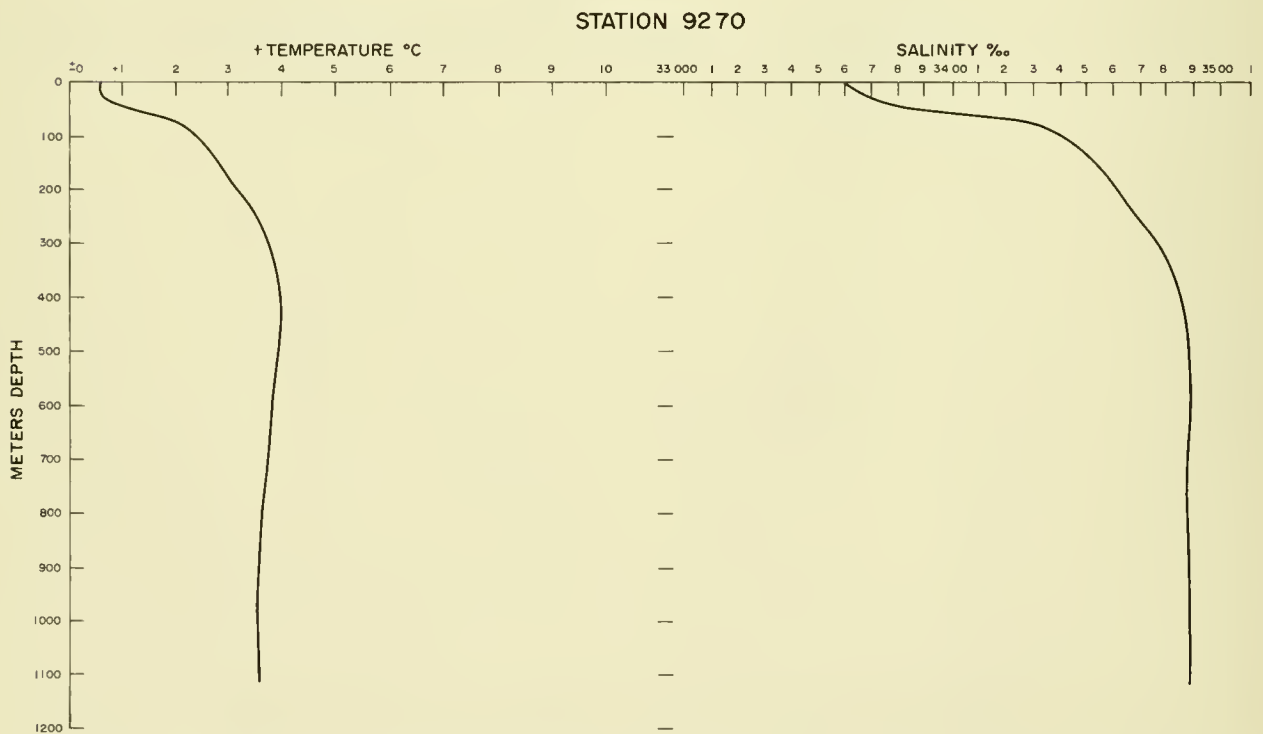


Figure 2D. Vertical distribution of temperature and salinity for station 9252 based on observed data points.



**Figure 3D.** Vertical distribution of temperature and salinity for station 9268 based on observed data points.



**Figure 4D.** Vertical distribution of temperature and salinity for station 9270 based on observed data points.



# STATION 9244

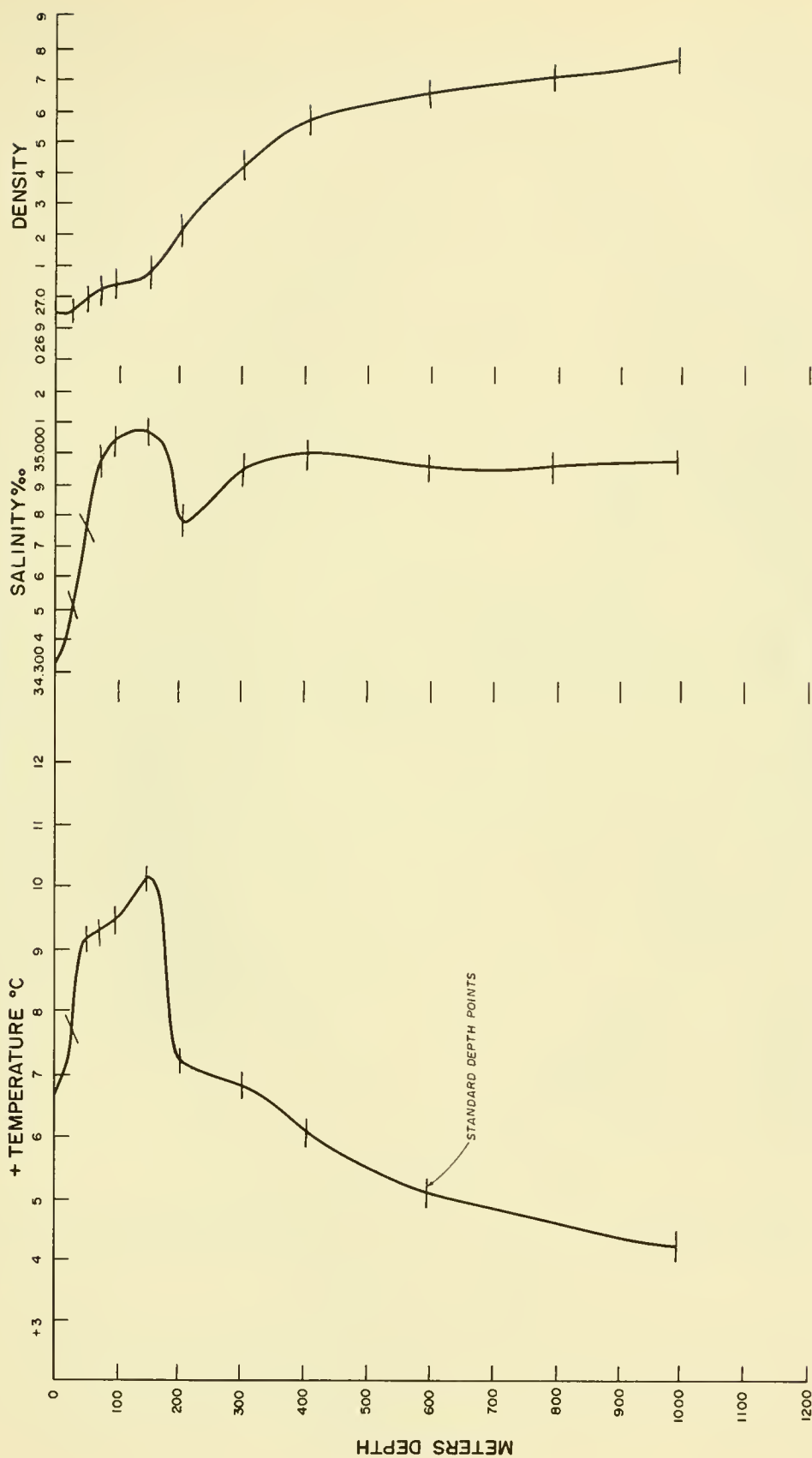


Figure 6D. Vertical distribution of temperature, salinity and density for station 9244 based on abstracted standard depth data points from the "true" curve shown in figure 5.

# STATION 9244

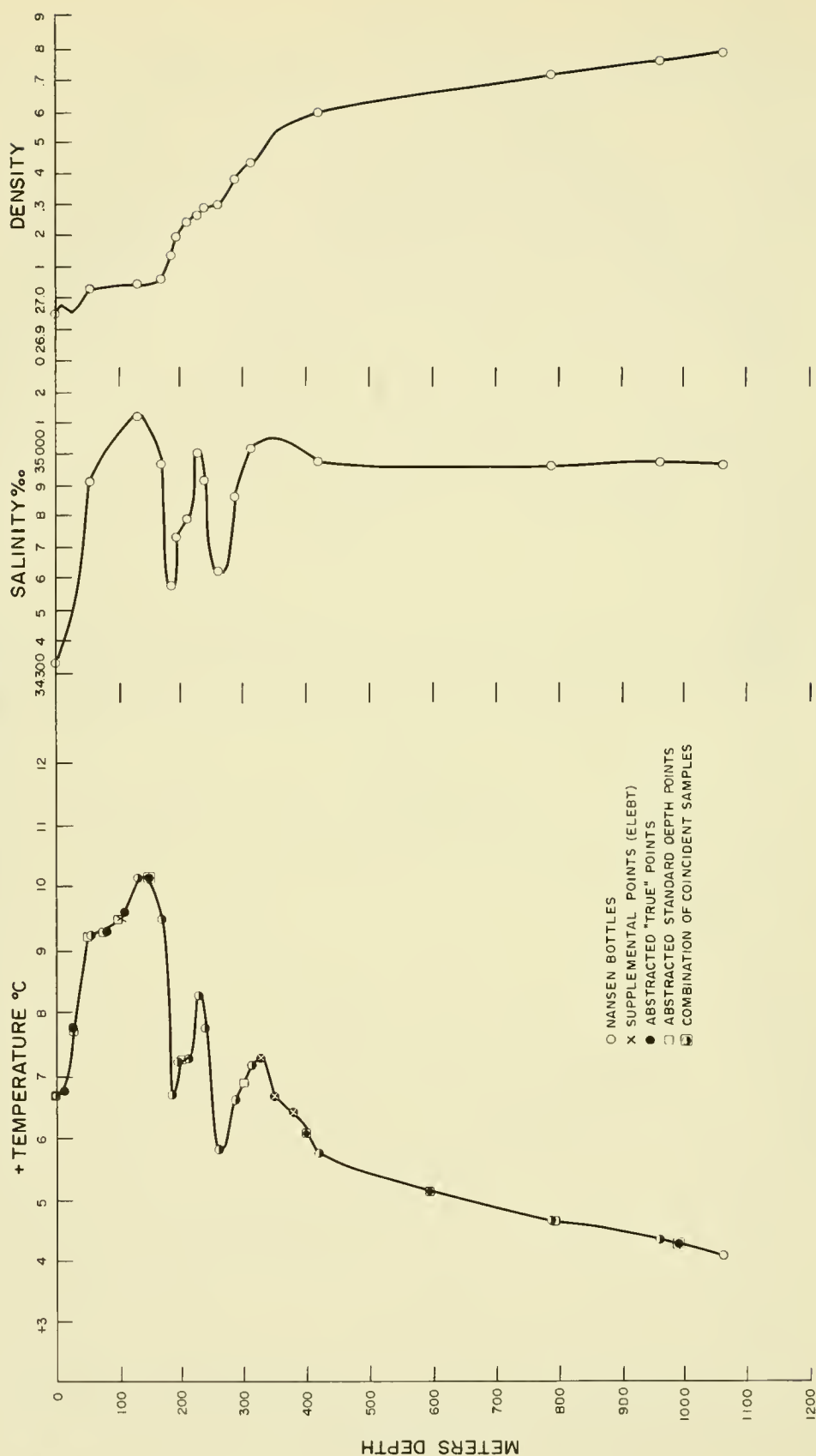


Figure 5D. Vertical distribution of temperature, salinity and density for station 9244 based on observed data and supplemental bathythermograph points. Also shown are the points used for the 3 sets of dynamic height computations based on; Nansen bottles (observed values), Abstracted Standard depths, or Abstracted "True" points.

CURRENT ERROR CM/SEC

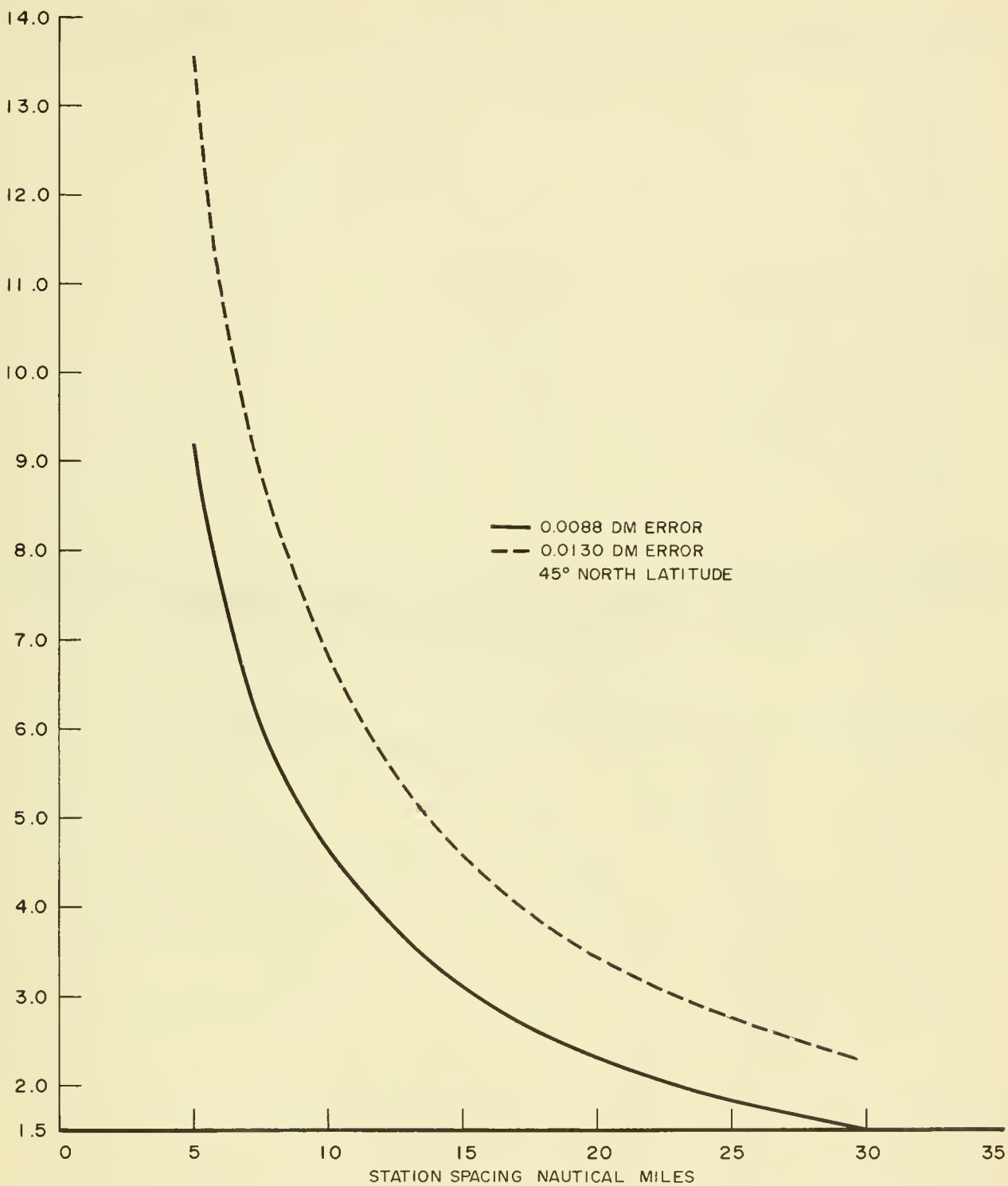
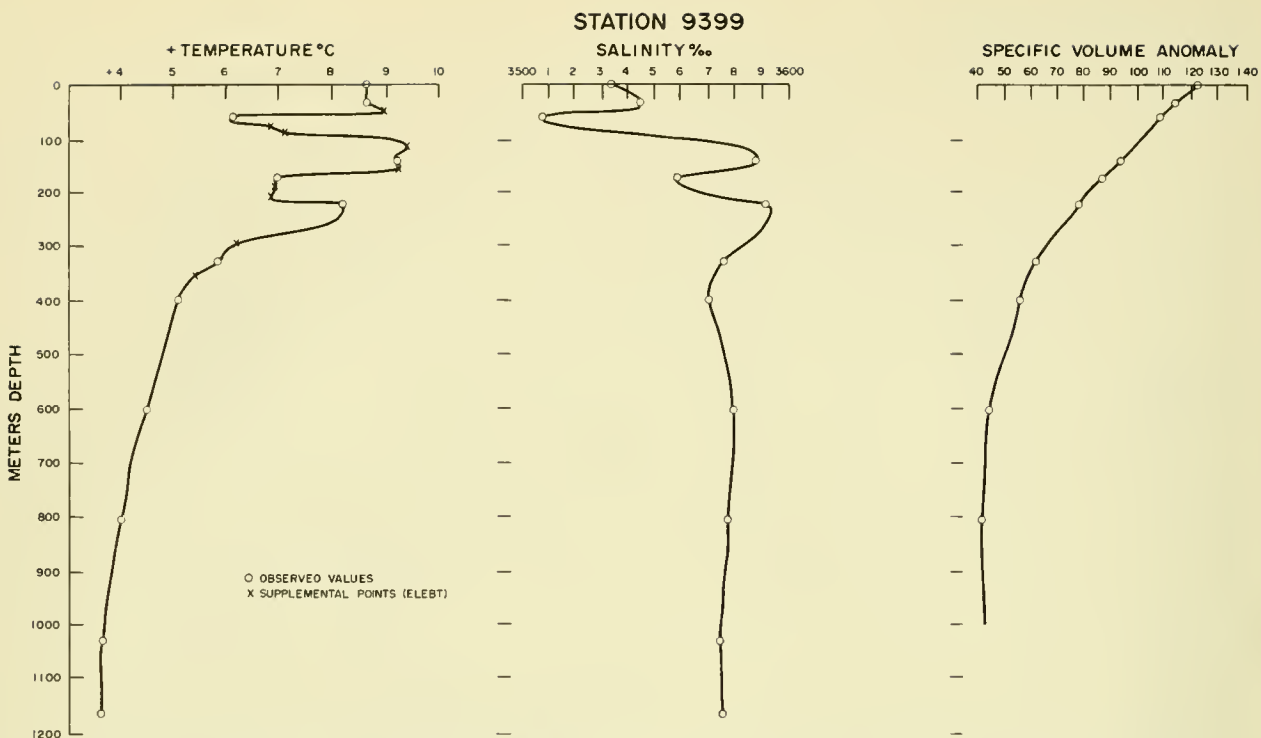
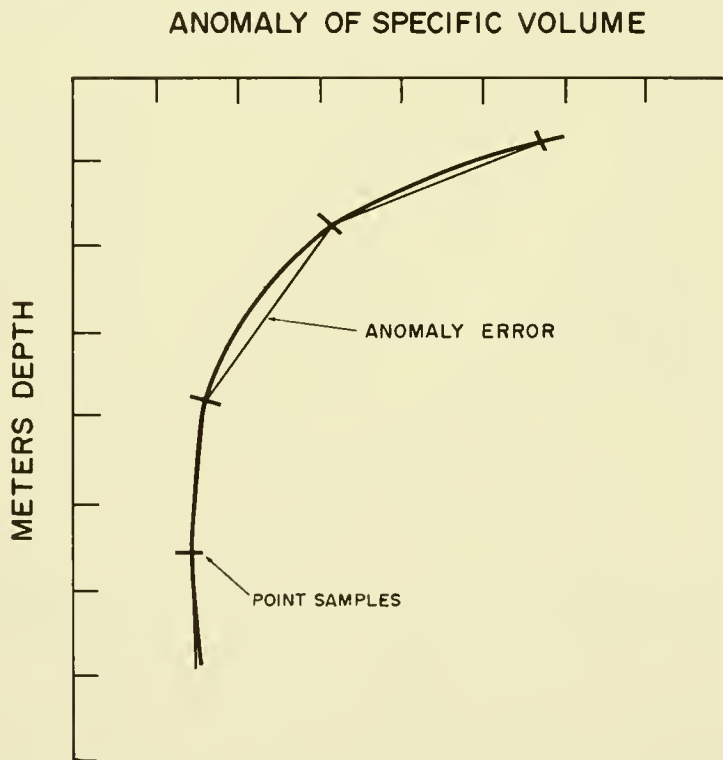


Figure 7D. Curves representing a surface dynamic height error between any two stations showing the relation between the station spacing and computed current velocity error.



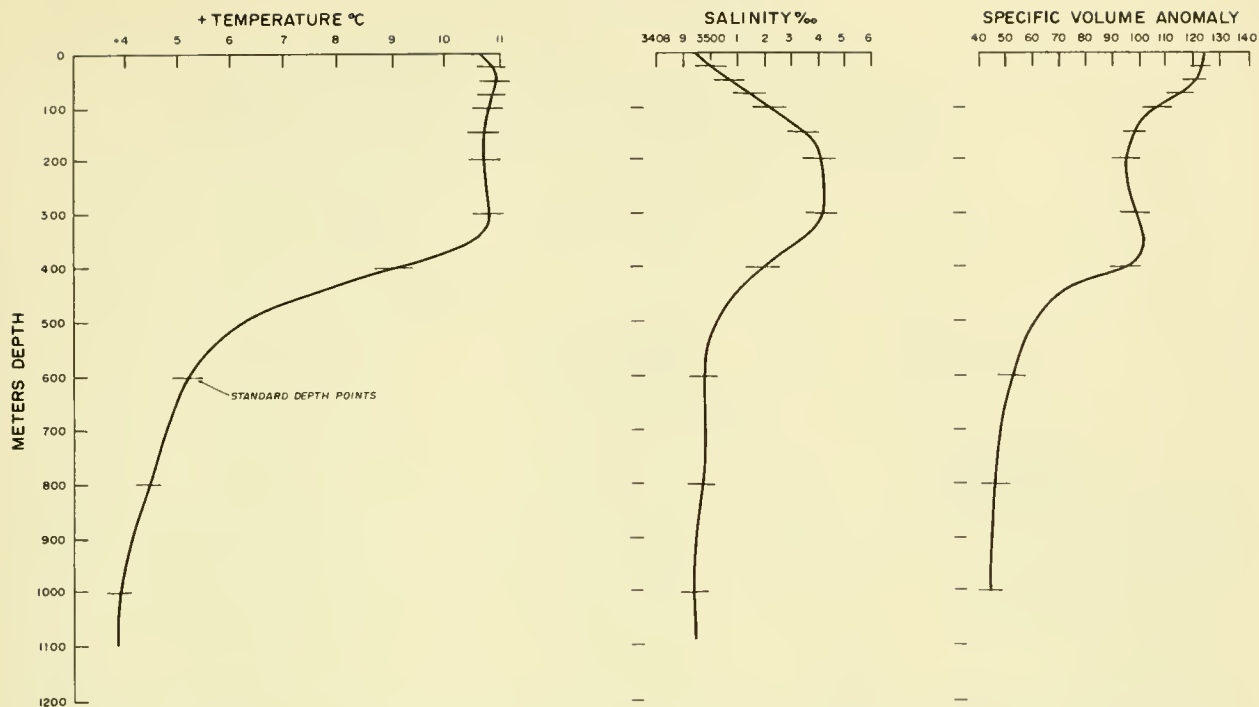
**Figure 8D.** Vertical distribution of temperature, salinity and specific volume anomaly for station 9399 based on observed values and supplemental points from the electronic bathythermograph.



**Figure 9D.** Plot showing the anomaly of specific volume error that results from the straight line numerical integration of the point samples. This error is the result of the straight line's departure from the smooth "true" curve.

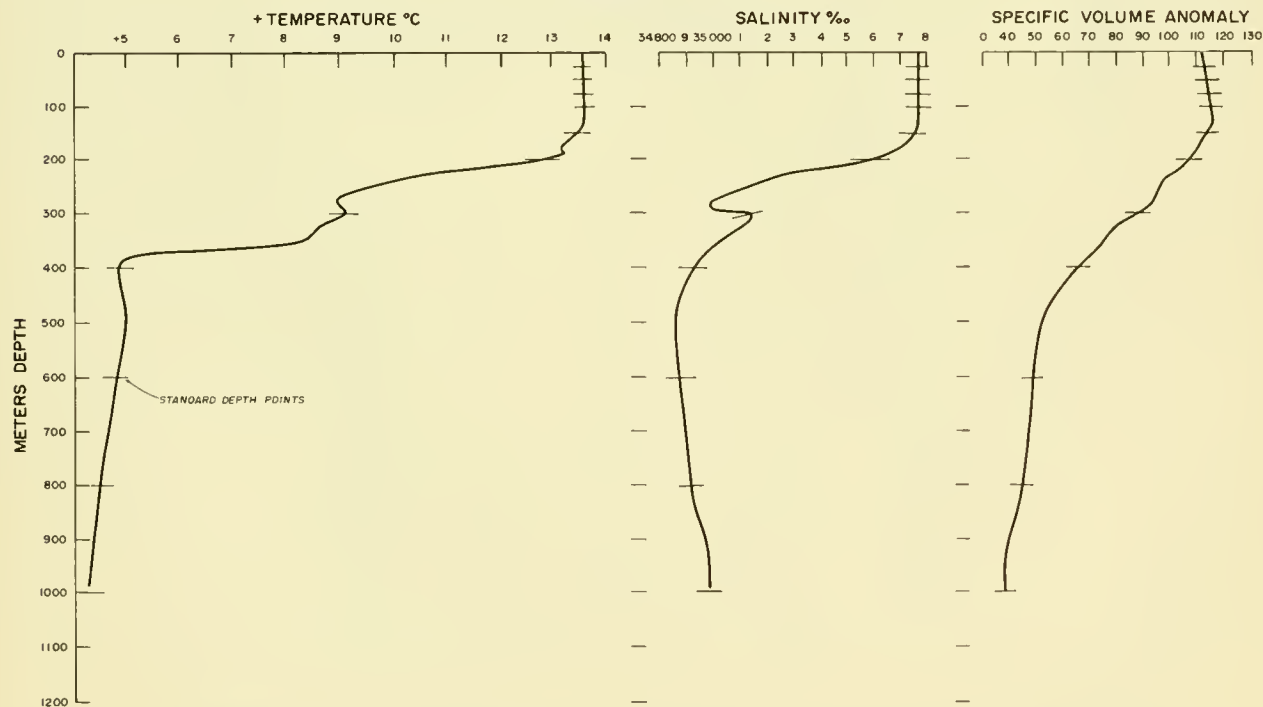


# STATION 9386



**Figure 10D.** Vertical distribution of temperature, salinity and specific volume anomaly for station 9386 based on observed values. Shown also are the Standard depth points along each curve.

# STATION 9248



**Figure 11D.** Vertical distribution of temperature, salinity and specific volume anomaly for station 9248 based on observed values. Shown also are the Standard depth points along each curve.

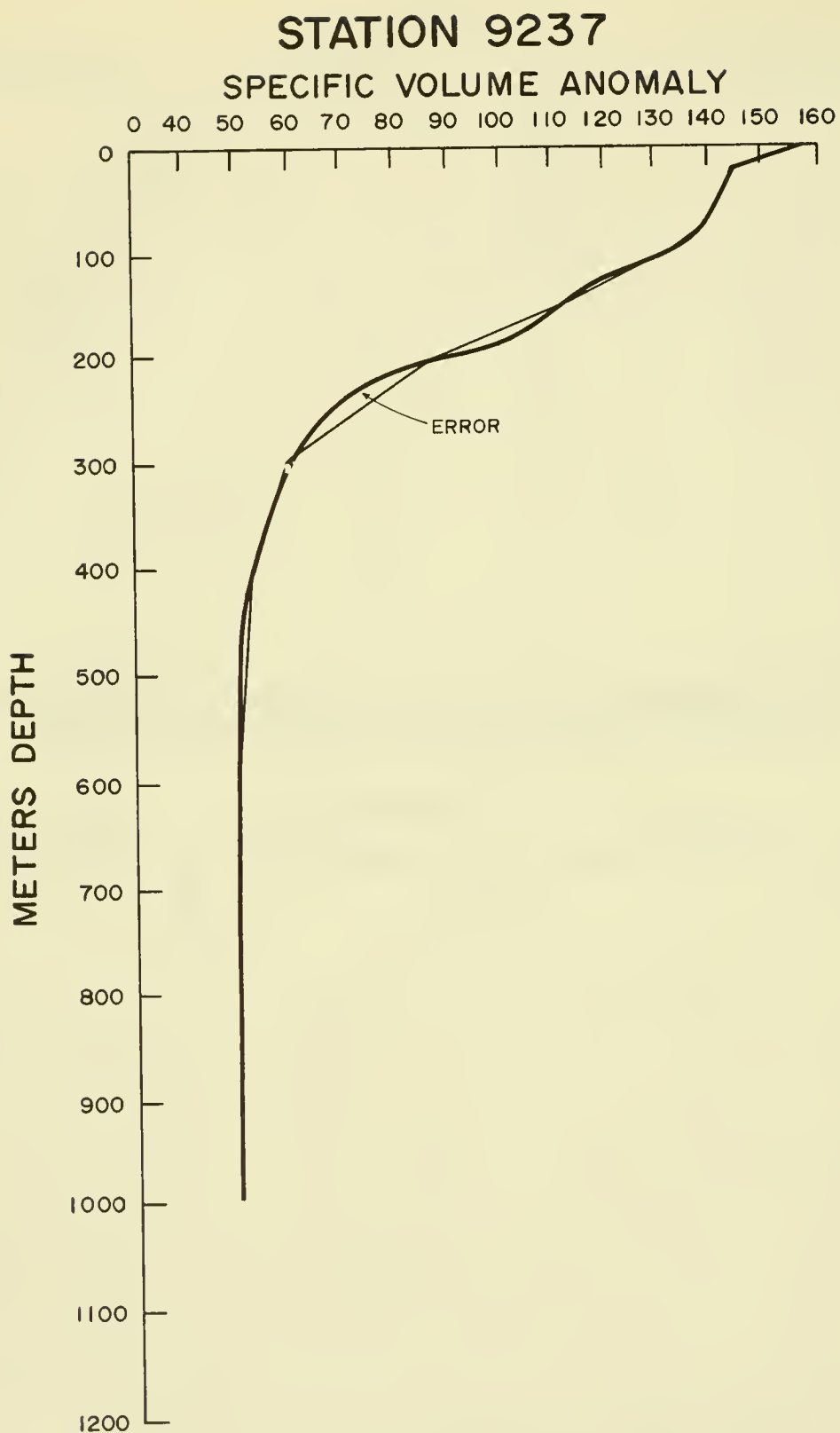


Figure 12D. Vertical distribution of the specific volume anomaly showing straight lines drawn between Standard depth levels. The area between the straight lines and the smooth "true" curve represents the numerical integration error.

**TABLE ID. Comparison of number of Nansen bottles used for gradient sampling during Ice Patrol 1965 and what would have been used for standard depth sampling**

Survey	Number of stations	Gradient sampling	Standard depth sampling	Difference
1st-----	62	517	637	120
3d-----	57	464	576	112

**TABLE IID. Standard deviations between standard depths and gradient sampling dynamic height computations**

	Number of stations	True standard ( $\sigma$ )	$2\sigma$	Maximum difference	True gradient ( $\sigma$ )	$2\sigma$	Maximum difference
Stations to 1,000 meters.	62	$\pm 0.0066$ DM.	$\pm 0.0133$ DM.	$+0.020$ DM.	$\pm 0.0044$ DM.	$\pm 0.0088$ DM.	$-0.012$ DM.
All stations---	119	$\pm 0.0052$ DM.	$\pm 0.0104$ DM.	$-0.008$ DM.	$\pm 0.0039$ DM.	$\pm 0.0078$ DM.	$-0.014$ DM.

**TABLE IID. Plus and minus errors in dynamic heights obtained from the measurement of the areas bounded by the idealized distribution curve of the specific volume anomaly and straight lines between standard depths**

Station No.	+ error	- error	Alg. sum, dynamic meters
9236-----	0.0075	0.0007	+0.0068
9244-----	.0035	.0043	-.0008
9247-----	.0025	.0004	+.0021
9248-----	.0107	.0018	+.0089
9249-----	.0036	.0020	+.0016
9379-----	.0040	.0009	+.0031
9386-----	.0221	.0038	+.0183
9396-----	.0067	.0054	+.0013
9399-----	.0040	.0016	+.0024
9407-----	.0109	.0023	+.0086
9241-----	.0041	.0013	+.0028
9408-----	.0034	.0019	+.0015
9242-----	.0075	.0004	+.0071
9243-----	.0050	.0018	+.0032
9240-----	.0040	.0016	+.0024
9385-----	.0047	.0038	+.0009
9398-----	.0061	.0030	+.0031

TABLE IVD. Instrument measurement error

Station No.	True dynamic height DM	Dynamic height with maximum instrument error $\pm 0.05^{\circ}\text{C}$ , $\pm$ $0.030\text{‰}$ DM	Maximum error	$2\sigma$ of normal distribution curve	Dynamic height with maximum instrument error $\pm 0.01^{\circ}\text{C}$ , $\pm$ $0.030\text{‰}$ DM	Maximum error	$2\sigma$ of normal distribution curve	Dynamic height with maximum instrument error $\pm 0.016^{\circ}\text{C}$ , $\pm$ $0.014\text{‰}$ DM	Maximum error	$2\sigma$ of normal distribution curve
9236	0.5737	0.6016	0.0279	0.0275	0.5971	0.0234	0.0231	0.5859	0.0122	0.0120
9241	.5925	.6195	.0270	.0266	.6159	.0234	.0231	.6043	.0118	.0116
9242	.5663	.5942	.0279	.0275	.5896	.0233	.0230	.5786	.0123	.0121
9243	.6825	.7116	.0291	.0287	.7060	.0235	.0232	.6947	.0122	.0120
9247	.5950	.6270	.0320	.0316	.6221	.0271	.0267	.6084	.0134	.0132
9248	.7341	.7634	.0293	.0289	.7574	.0233	.0230	.7466	.0125	.0123
9249	.5892	.6176	.0284	.0280	.6128	.0236	.0233	.6015	.0123	.0121
9268	.5291	.5571	.0280	.0276	.5525	.0234	.0231	.5413	.0122	.0120
9379	.5248	.5527	.0279	.0275	.5483	.0235	.0232	.5370	.0122	.0120
9385	.6035	.6344	.0309	.0305	.6270	.0235	.0232	.6158	.0123	.0121
9396	.5613	.5894	.0281	.0277	.5848	.0235	.0232	.5734	.0121	.0119
9398	.6960	.7251	.0291	.0287	.7194	.0234	.0231	.7086	.0126	.0124
9399	.6028	.6313	.0285	.0281	.6262	.0234	.0231	.6152	.0124	.0122
9400	.5960	.6249	.0289	.0285	.6191	.0231	.0228	.6086	.0126	.0124
9408	.5332	.5589	.0257	.0253	.5528	.0196	.0193	.5454	.0122	.0120
Averages			.0286	.0282		.0234	.0231		.0124	.0122

\*All Dynamic Heights must be added to the standard 970.403 based on the 1,000-decibar level.

TABLE VD. Thermometer comparisons

Survey	$\sigma$	$2\sigma$	Number of comparisons
1st	$\pm 0.005^{\circ}\text{C}$	$\pm 0.010^{\circ}\text{C}$	342
2d	$\pm 0.007^{\circ}\text{C}$	$\pm 0.014^{\circ}\text{C}$	177
3d	$\pm 0.008^{\circ}\text{C}$	$\pm 0.016^{\circ}\text{C}$	294

## TABLE OF OCEANOGRAPHIC DATA

The following is the observed and interpolated data for the Coast Guard Oceanographic Unit oceanographic stations taken in conjunction with the International Ice Patrol 1965 in the Grand Banks of Newfoundland area. The data was obtained from CG cutter *Evergreen*, 30 March 1965, to 25 May 1965. Presentation is from National Oceanographic Data Center Cruise Listing No. 31-540.

Notes:

Depth to bottom—uncorrected sounding depth in meters based on a speed of sound in sea water of 4,800 ft./sec.

Depth (m)—postscript T indicates a depth determined by thermometric calculations.

Sound velocity—in meters per second to tenths according to Wilson's formula.

A complete description of codes can be found in NODC publication M-2, "Processing Physical and Chemical Data From Oceanographic Stations."

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MD	DAY	HR, 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4202 N	05145 W		150	21	03	30	153	1965	001	9235	3383	14	30	B	B		X1	8	5	0001
						WATER		WIND		AIR TEMP. °C		BARO- METER		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB	VIS. CODE											
						04		29	S12	119	072	061	8	10									
MESSAGE TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>2</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH	S C C					
153		STD	0000	0192	3352	2681	0012441		0000	14559													
		OBS	0000	0192	33517	2681				14559													
		STD	0010	0213	3360	2686	0011967		0012	14571													
		STD	0020	0233	3368	2691	0011515		0024	14582													
		STD	0030	0252	3376	2696	0011063		0035	14593													
		STD	0050	0287	3390	2704	0010303		0057	14614													
153		STD	0075	0324	3406	2714	0009436		0081	14636													
		STD	0100	0354	3420	2722	0008677		0104	14655													
		STD	0125	0376	3432	2729	0008007		0125	14670													
		OBS	0133	0382	34352	2731				14674													
		STD	0150	0384	3440	2735	0007507		0144	14678													
		STD	0200	0393	3453	2744	0006667		0180	14692													
153		OBS	0221	0397	34583	2748				14698													
		STD	0250	0405	3459	2748	0006390		0212	14706													
		STD	0300	0419	3464	2750	0006213		0244	14721													
153		OBS	0373	0440	34805	2761				14744													
		STD	0400	0482	3490	2763	0005122		0300	14767													
153		OBS	0401	0483	34898	2764				14768													
		OBS	0446	0460	34909	2767				14766													
153		STD	0500	0435	3490	2769	0004649		0349	14764													
		STD	0600	0399	3488	2771	0004488		0395	14766													
		OBS	T0674	0380	34874	2773				14770													
		STD	0700	0378	3488	2773	0004378		0439	14773													
		STD	0800	0372	3488	2774	0004352		0483	14788													
		STD	0900	0366	3489	2775	0004316		0526	14802													
153		OBS	0902	0366	34889	2775				14802													
		STD	1000	0364	3489	2776	0004369		0570	14817													
		STD	1100	0362	3489	2776	0004429		0614	14833													
153		OBS	T1152	0361	34892	2776				14842													
		STD	1200	0360	3489	2776	0004488		0658	14849													
		STD	1300	0358	3489	2776	0004545		0703	14865													
153		OBS	T1359	0357	34888	2776				14875													

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER				
CTRY CODE	ID. NO.					10"	1"	MD	DAY	HR, 1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT			
31	540	EV	4225 N	05116 W		150	21	03	30	196	1965	001	9236	2487	12	28	5	4		X2	6	8	0002			
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE			DRY BULB	WET BULB													
						06		12	S04	071	039	039	8	15												
MESSAGE TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$		$\Sigma \Delta$ D DYN. M. x 10 <sup>3</sup>		SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{ml/l}$	TOTAL-P $\mu\text{g} - \text{ml/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{ml/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{ml/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{ml/l}$	pH	S C C					
196		STD	0000	0047	3328	2672		0013332		0000		14491														
		OBS	0000	0047	33283	2672						14491														
		STD	0010	0041	3329	2672		0013276		0013		14489														
		STD	0020	0035	3329	2673		0013220		0027		14488														
		STD	0030	0029	3329	2674		0013172		0040		14487														
		STD	0050	0016	3330	2675		0013062		0066		14485														
196		OBS	0060	0010	33300	2675						14484														
196		OBS	0066	0204	33544	2683						14575														
		STD	0075	0391	3382	2688		0011870		0097		14661														
196		OBS	0086	0538	34076	2692						14728														
		STD	0100	0586	3427	2702		0010654		0125		14752														
196		OBS	0102	0589	34291	2703						14754														
		STD	0125	0561	3450	2723		0008669		0149		14749														
196		OBS	0127	0555	34513	2725						14747														
		STD	0150	0438	3447	2735		0007507		0170		14702														
196		OBS	0152	0435	34470	2735						14701														
196		OBS	0178	0495	34628	2741						14732														
		STD	0200	0514	3469	2743		0006790		0205		14745														
196		OBS	0203	0516	34703	2744						14746														
		STD	0250	0508	3480	2753		0005959		0237		14752														
		STD	0300	0498	3487	2760		0005380		0266		14757														
196		OBS	0305	0497	34876	2760						14757														
		STD	0400	0472	3494	2768		0004670		0316		14764														
196		OBS	T0404	0471	34943	2768						14764														
		STD	0500	0426	3492	2772		0004398		0361		14761														
		STD	0600	0394	3491	2774		0004209		0404		14764														
196		OBS	0604	0393	34909	2774						14764														
		STD	0700	0384	3491	2775		0004207		0446		14776														
		STD	0800	0375	3491	2776		0004208		0488		14789														
196		OBS	0802	0375	34906	2776						14789														
		STD	0900	0366	3490	2776		0004233		0531		14802														
		STD	1000	0360	3490	2777		0004248		0573		14816														
196		OBS	1018	0359	34897	2777						14818														
		STD	1100	0356	3489	2777		0004357		0616		14831														
196		OBS	T1193	0355	34886	2776						14846														



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR. 1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT					
31	540	EV	4250 N	05042 W	150	20	03	30	239	1965	001	9237	207	11	30	7	4		X7	6	8	0003						
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS														
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB	WET BULB	VIS. CODE															
									11	S06	051	006	006	7	10													
MESSAGE TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME AND MALT-X10 <sup>3</sup>	Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>3</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CC											
239		STD	0000	0158	3304	2645	0015845	0000	14537																			
		OBS	0000	0158	33038	2645			14537																			
		STD	0010	0125	3309	2652	0015242	0016	14525																			
		STD	0020	0098	3313	2657	0014776	0031	14515																			
239		OBS	0024	0088	33145	2658			14511																			
		STD	0030	0083	3315	2659	0014532	0045	14510																			
		STD	0050	0068	3317	2662	0014300	0074	14507																			
		STD	0075	0049	3319	2665	0014010	0109	14503																			
239		OBS	0088	0039	33207	2666			14500																			
		STD	0100	0012	3329	2674	0013083	0143	14491																			
		239		OBS	0108	0001	33345	2679			14487																	
				STD	0125	0038	3350	2690	0011615	0174	14510																	
STD	0150			0091	3372	2704	0010253	0202	14541																			
STD	0200			0186	3409	2728	0008123	0247	14597																			
239		OBS	0219	0218	34213	2735			14616																			
		STD	0250	0263	3434	2741	0006895	0285	14642																			
		STD	0300	0324	3452	2750	0006139	0318	14679																			
		239		OBS	0387	0396	34740	2761			14727																	
STD	0400			0397	3475	2761	0005247	0375	14730																			
STD	0500			0402	3480	2765	0005023	0426	14749																			
239				OBS	T0574	0405	34823	2766			14763																	
		STD	0600	0406	3483	2767	0004935	0476	14768																			
		STD	0700	0408	3484	2767	0004980	0525	14785																			
		239		OBS	0758	0409	34847	2768			14795																	
STD	0800			0406	3485	2768	0004980	0575	14801																			
STD	0900			0399	3487	2771	0004843	0624	14815																			
239				OBS	T0953	0397	34871	2771			14823																	
		STD	1000	0396	3487	2771	0004884	0673	14831																			
		239		OBS	T1062	0395	34874	2771			14841																	

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.			10"		1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER					DIR.	HGT	PER	SEA	TYPE	AMT		
31	540	EV	4313 N	05017 W		150	30	03	31	036	1965	001	9238		0073	01	31	3	4		X7	5	8	
						WATER		WIND		BARO- METER		AIR TEMP. °C				SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	meter (mb)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS										
								11	S03	003	011	006	7	03										
MESSAGE TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME AND MALT-X10 <sup>3</sup>		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>3</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	S CC						
036		STD	0000	0218	3278	2621	0018193		0000	14560														
		OBS	0000	0218	32783	2621				14560														
		STD	0010	0218	3278	2621	0018187		0018	14562														
		STD	0020	0217	3279	2621	0018175		0036	14563														
036		STD	0030	0214	3279	2621	0018156		0055	14563														
		OBS	0040	0211	32786	2621				14564														
		STD	0050	0206	3280	2623	0017989		0091	14563														
036		OBS	0070	0194	32831	2626				14562														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARS SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4258 N	05019 W		150	20	03	31	056	1965	001	9239	0256	02	32	4	3		X2	6	8	0005
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB											
									36	510	003	000	000	8	07								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-20°		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH					
		STD	0000	0200	3289	2630	0017283		0000	14554													
056		OBS	0000	0200	32886	2630				14554													
		STD	0010	0200	3289	2630	0017280		0017	14555													
		STD	0020	0201	3289	2630	0017270		0035	14557													
		STD	0030	0201	3289	2631	0017266		0052	14559													
056		OBS	0030	0201	32890	2631				14559													
056		OBS	0041	0199	32887	2630				14560													
		STD	0050	0160	3295	2638	0016533		0086	14545													
056		OBS	0051	0155	32956	2639				14543													
		STD	0075	0029	3323	2669	0013631		0123	14494													
056		OBS	0081	0007	33288	2674				14486													
		STD	0100	0014	3333	2677	0012789		0156	14493													
		STD	0125	0031	3341	2683	0012263		0188	14506													
		STD	0150	0057	3353	2691	0011491		0217	14523													
056		OBS	0162	0073	33597	2696				14533													
		STD	0200	0136	3387	2714	0009420		0270	14572													
056		OBS	T0203	0142	33890	2715				14575													

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARS SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT
31	540	EV	4246 N	05020 W		150	20	03	31	070	1965	001	9240	1134	10	21	4	5		X2	2	8	0006
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	(mb)	DRY BULB	WET BULB											
									04	509	993	006	006	8	09								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-20°		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH						
		STD	0000	0089	3313	2658	0014694		0000	14508													
070		OBS	0000	0089	33134	2658				14508													
		STD	0010	0086	3314	2658	0014631		0015	14508													
		STD	0020	0082	3314	2658	0014608		0029	14508													
		STD	0030	0078	3314	2659	0014585		0044	14508													
		STD	0050	0068	3316	2661	0014375		0073	14507													
070		OBS	0061	0061	33169	2662				14505													
		STD	0075	0050	3319	2664	0014040		0108	14503													
		STD	0100	0031	3323	2669	0013638		0143	14499													
070		OBS	0117	0018	33256	2671				14496													
		STD	0125	0027	3336	2679	0012622		0176	14503													
		STD	0150	0067	3368	2703	0010410		0205	14530													
070		OBS	0178	0136	34009	2725				14570													
		STD	0200	0209	3424	2738	0007171		0249	14609													
070		OBS	T0203	0218	34268	2739				14614													
		STD	0250	0261	3437	2744	0006675		0283	14642													
		STD	0300	0300	3447	2749	0006263		0315	14668													
		STD	0400	0358	3468	2760	0005329		0373	14712													
070		OBS	T0402	0359	34688	2760				14713													
		STD	0500	0375	3473	2762	0005233		0426	14737													
		STD	0600	0391	3478	2764	0005163		0478	14761													
070		OBS	T0601	0391	34777	2764				14761													
		STD	0700	0403	3482	2766	0005074		0529	14783													
070		OBS	T0796	0408	34853	2768				14801													
		STD	0800	0408	3485	2768	0004982		0580	14802													
		STD	0900	0406	3486	2769	0004971		0629	14818													
		STD	1000	0397	3488	2771	0004874		0679	14831													
070		OBS	T1014	0395	34877	2772				14833													

REFERENCE		SHIP CODE	LATITUDE °	LONGITUDE °	DATE INDIC	MARS SQUARE		STATION TIME IGMT		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	IO. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT		
31	540	EV	4238 N	05019 W		150	20	03	31	089	1965	001	9241		1701	11	32	4	4		X2	4	8		0007
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
COLOR CODE		TRANS. mm	DIR.	SPEED OR FORCE	DRY BULB		WET BULB																		
						03		502		986		000		000		8		16							
MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ D OYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CC								
		STD	0000	0065	3319	2663	0014151	0000	14497																
089		OBS	0000	0065	33188	2663			14497																
		STD	0010	0052	3321	2666	0013913	0014	14493																
		STD	0020	0040	3323	2668	0013697	0028	14490																
		STD	0030	0028	3325	2670	0013482	0041	14486																
089		OBS	0038	0019	33269	2672			14484																
		STD	0050	0007	3329	2674	0013094	0068	14481																
089		OBS	0067	-0010	33312	2677			14476																
		STD	0075	0058	3358	2695	0011121	0098	14512																
		STD	0100	0270	3404	2717	0009132	0124	14617																
089		OBS	0106	0321	34056	2714			14640																
089		OBS	0115	0178	34022	2723			14578																
		STD	0125	0157	3403	2725	0008363	0145	14571																
089		OBS	0125	0157	34027	2725			14571																
089		OBS	0130	0180	34114	2730			14583																
089		OBS	0134	0200	34221	2737			14594																
089		OBS	0144	0230	34312	2742			14610																
		STD	0150	0254	3434	2742	0006762	0164	14622																
089		OBS	0172	0321	34429	2743			14656																
		STD	0200	0312	3446	2747	0006403	0197	14657																
089		OBS	T0239	0309	34509	2751			14663																
		STD	0250	0316	3453	2752	0005950	0228	14668																
		STD	0300	0345	3462	2756	0005594	0257	14690																
089		OBS	0383	0382	34740	2762			14721																
		STD	0400	0387	3476	2763	0005065	0310	14726																
		STD	0500	0407	3484	2767	0004780	0360	14752																
089		OBS	T0577	0411	34873	2770			14767																
		STD	0600	0406	3487	2770	0004612	0407	14768																
		STD	0700	0389	3488	2772	0004483	0452	14778																
089		OBS	0768	0380	34881	2773			14785																
		STD	0800	0377	3488	2774	0004414	0496	14790																
		STD	0900	0371	3488	2774	0004439	0541	14804																
089		OBS	T0977	0367	34880	2775			14815																
		STD	1000	0366	3488	2775	0004466	0585	14818																
		STD	1100	0364	3488	2775	0004519	0630	14834																
089		OBS	T1148	0364	34881	2775			14842																

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT MILES	MARSDEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPLES	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
CTRY CODE	ID. NO.						10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT			
31	540	EV	4212 N	05022 W	150	20	03	31	131	1965	001	9242	3036	12	01	3	2			X7	5	8	0008				
		WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS													
		COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB	DRY BULB	WET BULB	DRY BULB	WET BULB	DRY BULB	WET BULB														
						16	S05	997	026	026	7	12															
MESSAGE TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-20°	Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SIO <sub>4</sub> -Si μg - dl/l	pH	S C										
		STD	0000	0284	3355	2676	0012918	0000	14599																		
131	08S	0000	0284	33547	2676				14599																		
	STD	0010	0286	3355	2676	0012917	0013		14602																		
131	08S	0012	0290	33557	2677				14604																		
	STD	0020	0345	3367	2681	0012527	0026		14631																		
	STD	0030	0401	3379	2685	0012156	0038		14658																		
131	08S	0035	0423	33838	2686				14668																		
	STD	0050	0429	3384	2686	0012078	0062		14673																		
	STD	0075	0440	3386	2686	0012056	0092		14682																		
131	08S	0086	0444	33886	2688				14686																		
	STD	0100	0310	3390	2702	0010533	0121		14632																		
	STD	0125	0196	3401	2720	0008777	0145		14588																		
131	08S	0131	0192	34055	2724				14588																		
	STD	0150	0336	3432	2733	0007643	0165		14657																		
131	08S	0180	0506	34657	2742				14738																		
	STD	0200	0496	3469	2746	0006583	0201		14737																		
	STD	0250	0477	3477	2754	0005827	0232		14739																		
	STD	0300	0467	3484	2761	0005262	0260		14744																		
131	08S	0300	0467	34838	2761				14744																		
131	08S	T0398	0471	34945	2769				14763																		
	STD	0400	0470	3495	2769	0004573	0309		14763																		
	STD	0500	0444	3495	2772	0004381	0354		14769																		
131	08S	0594	0424	34953	2774				14776																		
	STD	0600	0423	3495	2774	0004246	0397		14777																		
	STD	0700	0413	3494	2775	0004300	0439		14789																		
	STD	0800	0403	3493	2775	0004350	0483		14801																		
	STD	0900	0393	3493	2776	0004322	0526		14813																		
131	08S	T0992	0383	34921	2776				14825																		
	STD	1000	0376	3492	2777	0004282	0569		14823																		
131	08S	T1016	0363	34920	2778				14820																		
	STD	1100	0360	3492	2779	0004181	0611		14833																		
	STD	1200	0356	3492	2779	0004218	0653		14848																		
131	08S	T1201	0356	34918	2779				14848																		

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARSDEN SQUARE	STATION TIME			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.						MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT			
31	540	EV	4140 N	05019 W		150	10	03	31	170	1965	001	9243	3786	12	32	2	2			X1	6	6	0009
							WATER		WIND		BARO- METER (mba)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
							COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB											
							03		30	S14		003	067				050	8	15					
MESSAGE TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-20°		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>2</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH	S C						
		STD	0000	1312	3573	2695	0011135		0000	15022														
170	08S	0000	1312	35729	2695					15022														
	STD	0010	1312	3573	2695	0011193		0011		15023														
	STD	0020	1312	3572	2695	0011242		0022		15025														
	STD	0030	1312	3572	2694	0011300		0034		15027														
170	08S	0030	1312	35718	2694					15027														
170	08S	0040	1297	35705	2696					15023														
	STD	0050	1132	3535	2701	0010719		0056		14964														
170	08S	0056	1049	35167	2702					14933														
	STD	0075	1042	3516	2702	0010617		0082		14933														
	STD	0100	1035	3515	2703	0010623		0109		14935														
	STD	0125	1030	3514	2703	0010654		0135		14937														
170	08S	0133	1029	35141	2703					14938														
	STD	0150	1028	3514	2703	0010682		0162		14941														
	STD	0200	1026	3515	2704	0010696		0216		14948														
170	08S	0210	1026	35155	2705					14950														
	STD	0250	0909	3503	2715	0009786		0267		14912														
170	08S	0287	0826	34961	2722					14886														
	STD	0300	0808	3496	2725	0008845		0313		14881														
170	08S	0313	0782	34945	2728					14873														
170	08S	T0363	0600	34814	2743					14808														
170	08S	0384	0625	34880	2745					14822														
	STD	0400	0634	3494	2748	0006696		0391		14829														
170	08S	0415	0640	34987	2751					14835														
	STD	0500	0573	3499	2760	0005649		0453		14822														
	STD	0600	0511	3500	2768	0004950		0506		14814														
170	08S	T0622	0500	34998	2769					14813														
	STD	0700	0473	3498	2771	0004721		0554		14814														
	STD	0800	0443	3497	2774	0004535		0600		14818														
170	08S	0827	0436	34969	2774					14820														
	STD	0900	0418	3497	2776	0004332		0645		14825														
	STD	1000	0399	3497	2779	0004182		0687		14833														
170	08S	T1052	0393	34973	2779					14839														
	STD	1100	0392	3497	2779	0004197		0729		14847														
	STD	1200	0388	3495	2778	0004393		0772		14862														
170	08S	T1238	0387	34942	2778					14868														

REFERENCE		SHIP CODE	LATITUDE ° ' 1/10	LONGITUDE ° ' 1/10	MARS SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S				WAVE OBSERVATIONS		WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO DAY HR, 1/10		CRUISE NO.	STATION NUMBER		DIR.	HGT	PER	SEA				TYPE	AMT	
31	540	EV	4203 N	04954 W	149	29	03	31 223	1965	001	9244	3430	11	28	4	4			X2	6	2	0010

WATER		WIND		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS	
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mb)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS		
			28	S20	020	022	006	8	17		

MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$ ?	$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH	S C
		STD	0000	0663	3432	2695	0011126	0000	14767								
223	OBS	0000	0663	34316	2695				14767								
	STD	0010	0697	3435	2693	0011327	0011	14782									
	STD	0020	0739	3443	2694	0011307	0023	14802									
223	OBS	0027	0772	34502	2694				14816								
	STD	0030	0793	3456	2696	0011107	0034	14826									
	STD	0050	0909	3488	2703	0010491	0055	14877									
223	OBS	0052	0919	34905	2703				14881								
	STD	0075	0946	3497	2704	0010474	0082	14896									
	STD	0100	0975	3504	2704	0010491	0108	14912									
	STD	0125	1004	3510	2704	0010521	0134	14927									
223	OBS	0132	1012	35122	2705				14931								
	STD	0150	0980	3506	2705	0010490	0160	14922									
223	OBS	0169	0946	34996	2706				14912								
223	OBS	0185	0664	34569	2715				14801								
223	OBS	0195	0719	34756	2722				14827								
	STD	0200	0719	3477	2723	0008827	0209	14828									
223	OBS	0211	0720	34792	2725				14830								
223	OBS	0227	0821	35006	2727				14875								
223	OBS	0236	0770	34943	2729				14856								
	STD	0250	0630	3469	2729	0008281	0251	14800									
223	OBS	T0262	0574	34608	2730				14778								
223	OBS	0288	0656	34867	2740				14819								
	STD	0300	0686	3494	2741	0007247	0290	14833									
223	OBS	0313	0710	35008	2743				14846								
	STD	0400	0589	3498	2757	0005808	0355	14812									
223	OBS	T0418	0568	34974	2759				14806								
	STD	0500	0539	3497	2763	0005378	0411	14808									
	STD	0600	0507	3497	2766	0005138	0464	14811									
	STD	0700	0480	3496	2769	0004948	0514	14817									
223	OBS	0794	0458	34956	2771				14823								
	STD	0800	0457	3496	2771	0004810	0563	14824									
	STD	0900	0441	3496	2773	0004666	0611	14834									
223	OBS	0968	0428	34968	2775				14840								
	STD	1000	0421	3497	2776	0004489	0656	14842									
223	OBS	T1069	0404	34965	2778				14847								

REFERENCE		SHIP CODE	LATITUDE ° ' 1/10	LONGITUDE ° ' 1/10	MARS SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S				WAVE OBSERVATIONS		WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO DAY HR, 1/10		CRUISE NO.	STATION NUMBER		DIR.	HGT	PER	SEA				TYPE	AMT	
31	540	EV	4225 N	04927 W	149	29	04	01 024	1965	001	9245	2743	11	26	3	3			X2	5	8	0011

WATER		WIND		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS	
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mb)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS		
			28	S10	054	022	017	7	10		

MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$ ?	$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH	S C
		STD	0000	0428	3382	2684	0012156	0000	14665								
024	OBS	0000	0428	33822	2684				14665								
024	OBS	0009	0428	33822	2684				14666								
	STD	0010	0428	3382	2684	0012163	0012	14666									
	STD	0020	0426	3382	2685	0012150	0024	14667									
	STD	0030	0423	3382	2685	0012145	0036	14668									
024	OBS	0041	0421	33821	2685				14668								
	STD	0050	0394	3379	2685	0012105	0061	14658									
024	OBS	0062	0367	33776	2687				14648								
	STD	0075	0390	3395	2698	0010883	0089	14663									
	STD	0100	0430	3424	2717	0009129	0114	14687									
	STD	0125	0462	3449	2734	0007618	0135	14708									
	STD	0150	0487	3470	2747	0006349	0153	14725									
024	OBS	0151	0488	34711	2748				14726								
	STD	0200	0483	3480	2756	0005614	0183	14733									
	STD	0250	0476	3486	2761	0005143	0210	14740									
	STD	0300	0469	3492	2767	0004672	0234	14746									
024	OBS	T0327	0464	34938	2769				14748								
	STD	0400	0446	3495	2772	0004297	0279	14753									
024	OBS	T0499	0428	34954	2774				14762								
	STD	0500	0428	3495	2774	0004167	0321	14762									
	STD	0600	0416	3496	2776	0004079	0363	14774									
024	OBS	0606	0415	34961	2776				14774								
	STD	0700	0403	3495	2777	0004087	0403	14785									
	STD	0800	0390	3494	2777	0004104	0444	14796									
	STD	0900	0377	3493	2778	0004109	0485	14807									
024	OBS	T0902	0377	34934	2778				14807								
	STD	1000		3494													
024	OBS	1077		34944													



REFERENCE		SHIP CODE	LATITUDE " 1/10	LONGITUDE " 1/10	DATE INDIC	MARSDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER										
CTRY CODE	IO. NO.						10"	1"	MO		DAY	HR.1/10			CRUISE NO.	STATION NUMBER				DIR.	HGT		PER	SEA	TYPE	AMT						
31	540	EV	4248 N	04902 W	149	29	04	01	055	1965	001	9246		2624	12	27	4	4		X0	0	0012										
							WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS															
							COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	(mbars)	DRY BULB	WET BULB																			
										27	524	064	028					022	8	15												
MESSAGE TIME HR. 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ ρ DTN, M. x 10 <sup>3</sup>		SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - a	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	NODC													
		STD	0000	0619	3427	2698	0010899		0000		14749																					
055		OBS	0000	0619	34273	2698					14749																					
		STD	0010	0629	3455	2718	0008966		0010		14758																					
		STD	0020	0739	3481	2723	0008478		0019		14807																					
055		OBS	0021	0755	34837	2723					14813																					
		STD	0030	0963	3508	2710	0009818		0028		14896																					
055		OBS	0031	0974	35092	2709					14901																					
055		OBS	0041	0958	35142	2715					14897																					
		STD	0050	0969	3514	2714	0009496		0047		14903																					
		STD	0075	0999	3514	2708	0010030		0072		14918																					
055		OBS	0092	1019	35143	2705					14928																					
		STD	0100	0926	3502	2711	0009822		0096		14893																					
055		OBS	0122	0742	34798	2722					14824																					
		STD	0125	0731	3479	2723	0008672		0119		14820																					
		STD	0150	0665	3475	2729	0008151		0140		14798																					
055		OBS	0154	0658	34742	2729					14796																					
		STD	0200	0671	3497	2746	0006657		0178		14811																					
055		OBS	0213	0674	34974	2745					14815																					
055		OBS	0233	0622	34920	2748					14797																					
		STD	0250	0613	3494	2751	0006203		0210		14796																					
055		OBS	T0252	0612	34944	2751					14796																					
		STD	0300	0564	3494	2757	0005654		0239		14785																					
		STD	0400	0487	3493	2766	0004913		0292		14770																					
055		OBS	0400	0487	34931	2766					14770																					
		STD	0500	0457	3495	2771	0004539		0339		14774																					
		STD	0600	0432	3497	2775	0004219		0383		14781																					
055		OBS	0603	0431	34968	2775					14781																					
		STD	0700	0412	3496	2776	0004132		0425		14789																					
		STD	0800	0397	3495	2777	0004111		0466		14799																					
055		OBS	T0808	0396	34952	2777					14800																					
		STD	0900	0390	3495	2778	0004145		0507		14813																					
		STD	1000	0384	3495	2778	0004159		0549		14827																					
055		OBS	T1027	0382	34946	2778					14830																					
		STD	1100	0383	3495	2779	0004240		0591		14843																					
		STD	1200	0388	3496	2779	0004347		0634		14862																					
055		OBS	1208	0389	34956	2778					14864																					

REFERENCE		SHIP CODE	LATITUDE " 1/10	LONGITUDE " 1/10	DATE INDIC	MARSDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	IO. NO.						10"	1"	MO		DAY	HR.1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT	
31	540	EV	4221 N	04836 W		149	28	04	01	091	1965	001	9247		3210	10	28	6	5		X1	3	2		0013
							WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
							COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	(mbars)	DRY BULB	WET BULB												
											28	515	068	033	025	7	11								
MESSAGE TIME HR. 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?		Σ Δ ρ DTN, M. x 10 <sup>3</sup>		SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH							
091		STD	0000	0716	3436	2692	0011465		0000		14788														
		OBS	0000	0716	34363	2692					14788														
		STD	0010	0743	3445	2695	0011196		0011		14802														
		STD	0020	0768	3452	2696	0011036		0022		14814														
		STD	0030	0790	3459	2699	0010841		0033		14825														
091		STD	0050	0827	3467	2699	0010815		0055		14843														
		OBS	0061	0843	34702	2699					14852														
		OBS	0070	0854	34714	2699					14858														
		STD	0075	0852	3474	2701	0010704		0082		14858														
		STD	0100	0839	3483	2710	0009895		0108		14858														
091		STD	0125	0826	3490	2718	0009237		0132		14858														
		STD	0150	0814	3494	2723	0008801		0154		14858														
		OBS	0161	0808	34954	2725					14858														
		STD	0200	0696	3488	2735	0007669		0195		14820														
		OBS	0240	0631	34874	2743					14801														
091		STD	0250	0626	3489	2745	0006783		0231		14801														
		OBS	0272	0616	34910	2748					14801														
		OBS	0286	0502	34758	2750					14755														
		STD	0300	0510	3479	2752	0006134		0264		14761														
		STD	0400	0569	3501	2762	0005357		0321		14804														
091		OBS	T0402	0570	35010	2762					14805														
		STD	0500	0528	3501	2767	0004936		0373		14804														
		STD	0600	0485	3501	2772	0004510		0420		14803														
		OBS	T0608	0482	35013	2773					14803														
		STD	0700	0436	3498	2775	0004303		0464		14799														
091		STD	0800	0400	3494	2776	0004273		0507		14800														
		OBS	0813	0396	34931	2776					14800														
		STD	0900	0377	3491	2776	0004287		0550		14807														
		STD	1000	0367	3491	2777	0004256		0592		14819														
		OBS	T1039	0367	34908	2777					14825														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH INDICATOR	MARS DEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER									
CTRY CODE	ID. NO.						10"	1"	MO		DAY	HR./10			CRUISE NO.	STATION NUMBER		DIR.		HGT	PER		SEA	TYPE	AMT						
31	540	EV	4201 N	04818 W		149	28	04	01	131	1965	001	9248		3457	09	28	5	4		X1	3 3		0014							
		WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	HD. OBS. DEPTHS	SPECIAL OBSERVATIONS																				
		COLOR CODE	TRANS. IMI	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																							
						27	510	108	061	050	7	12																			
MESSAGE TIME OF HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t^{25}$	$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C														
131		STD	0000	1352	3577	2690	0011615	0000	15036																						
		OBS	0000	1352	35770	2690			15036																						
		STD	0010	1352	3577	2690	0011651	0012	15037																						
		STD	0020	1353	3577	2690	0011686	0023	15039																						
		STD	0030	1353	3577	2690	0011722	0035	15041																						
		STD	0050	1354	3577	2690	0011793	0059	15044																						
		STD	0075	1355	3577	2690	0011875	0088	15049																						
131		STD	0100	1356	3577	2689	0011964	0118	15053																						
		STD	0125	1357	3577	2689	0012055	0148	15058																						
131		OBS	0137	1357	35771	2689			15060																						
		STD	0150	1348	3576	2690	0012013	0178	15059																						
131		OBS	0165	1324	35753	2694			15053																						
		STD	0200	1250	3560	2698	0011436	0237	15032																						
131		OBS	0219	1121	35375	2705			14988																						
131		OBS	0227	1048	35253	2708			14962																						
		STD	0250	0940	3501	2708	0010429	0291	14923																						
131		OBS	T0282	0885	34984	2715			14907																						
		STD	0300	0906	3515	2724	0008961	0340	14921																						
131		OBS	0303	0910	35157	2724			14922																						
131		OBS	0322	0858	35113	2729			14906																						
		STD	0400	0660	3496	2746	0006898	0419	14840																						
131		OBS	T0486	0499	34852	2758			14788																						
		STD	0500	0497	3486	2759	0005714	0482	14789																						
		STD	0600	0481	3488	2762	0005485	0538	14800																						
		STD	0700	0465	3490	2765	0005245	0592	14810																						
		STD	0800	0449	3492	2769	0005008	0643	14820																						
	131	OBS	0827	0445	34922	2770			14823																						
		STD	0900	0433	3496	2774	0004589	0691	14831																						
	131	OBS	T0914	0431	34973	2775			14832																						

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT		
31	540	EV	4301 N	04656 W		149	36	04	01	212	1965	001	9249		3749	10	26	4	5		X1	6	4	0015
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. IMI	DIR.	SPEED OF FORCE		DRY BULB	WET BULB												
								26	510	098	050	044	8	13										
MESSAGE TIME OF HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t^{25}$	$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PD <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C							
		STD	0000	0534	3415	2698	0010843	0000	14713															
212		OBS	0000	0534	34147	2698			14713															
		STD	0010	0540	3416	2698	0010826	0011	14717															
		STD	0020	0546	3420	2701	0010606	0022	14722															
212		OBS	0025	0549	34229	2703			14724															
		STD	0030	0573	3428	2704	0010334	0032	14735															
		STD	0050	0658	3446	2707	0010047	0052	14775															
212		OBS	0050	0658	34462	2707			14775															
		STD	0075	0716	3464	2713	0009523	0077	14804															
		STD	0100	0772	3476	2715	0009447	0101	14832															
		STD	0125	0824	3483	2712	0009723	0125	14857															
212		OBS	0125	0824	34830	2712			14857															
212		OBS	0135	0844	34841	2710			14866															
212		OBS	0145	0775	34779	2716			14841															
		STD	0150	0678	3466	2720	0008984	0148	14802															
212		OBS	0160	0515	34465	2726			14735															
		STD	0200	0599	3471	2735	0007667	0190	14779															
212		OBS	0240	0628	34862	2743			14800															
		STD	0250	0605	3486	2746	0006711	0225	14792															
		STD	0300	0517	3484	2755	0005865	0257	14764															
212		OBS	T0333	0483	34820	2757			14756															
		STD	0400	0482	3490	2764	0005085	0312	14767															
212		OBS	0415	0481	34913	2765			14770															
		STD	0500	0461	3493	2769	0004727	0361	14776															
		STD	0600	0442	3495	2772	0004463	0407	14784															
212		OBS	T0610	0440	34954	2773			14785															
		STD	0700	0434	3495	2773	0004462	0451	14798															
		STD	0800	0428	3495	2774	0004511	0496	14812															
		STD	0900	0422	3495	2774	0004550	0541	14826															
212		OBS	T0981	0417	34945	2775			14837															
		STD	1000	0413	3495	2775	0004515	0587	14839															
212		OBS	T1048	0400	34955	2777			14842															

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	MARSSEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT		
											10"											1"
31	540	EV	4316 N	04732 W	149	37	04	02	011	1965	001	9250	3585	11	27	4	3	X0	0		0016	
		WATER		WIND		AIR TEMP. °C																
		COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	BARO- METER (mba)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>3</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH	CLD CODE					
		STD	0000	0854	3491	2714	0009337	0000	14849													
011		OBS	0000	0854	34910	2714			14849													
		STD	0010	0867	3494	2714	0009327	0009	14856													
		STD	0020	0880	3497	2715	0009320	0019	14862													
		STD	0030	0891	3500	2715	0009285	0028	14869													
		STD	0050	0913	3506	2716	0009220	0046	14881													
011		OBS	0064	0926	35091	2717			14888													
		STD	0075	0931	3510	2717	0009228	0070	14892													
		STD	0100	0943	3513	2717	0009248	0093	14901													
		STD	0125	0954	3516	2718	0009264	0116	14910													
		STD	0150	0966	3519	2718	0009282	0139	14918													
011		OBS	0186	0982	35235	2719			14931													
		STD	0200	0846	3506	2727	0008490	0183	14880													
011		OBS	0239	0624	34831	2741			14797													
		STD	0250	0618	3487	2745	0006788	0222	14797													
011		OBS	T0267	0606	34905	2749			14796													
		STD	0300	0562	3488	2753	0006075	0254	14783													
011		OBS	0318	0543	34876	2755			14778													
		STD	0400	0503	3495	2765	0004962	0309	14777													
011		OBS	0425	0492	34963	2768			14776													
		STD	0500	0471	3496	2770	0004592	0357	14780													
		STD	0600	0445	3497	2773	0004379	0402	14786													
011		OBS	T0640	0436	34967	2774			14789													
		STD	0700	0422	3496	2775	0004256	0445	14793													
		STD	0800	0404	3495	2776	0004216	0487	14802													
011		OBS	0859	0396	34941	2776			14808													
		STD	0900	0391	3494	2777	0004215	0529	14813													
		STD	1000	0384	3494	2778	0004215	0571	14827													
		STD	1100	0382	3494	2778	0004272	0614	14843													
011		OBS	T1100	0382	34944	2778			14843													

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARSSEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	ID. NO.					10'	1'	MO		DAY	HR.1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT				
31	540	EV	4331 N	04801 W	149	38	04	02	062	1965	001	9251	3365	12	27	3	2		X7	6	8		0017				
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB															
									26	525	119	033	028	6	12												
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{ml/l}$	TOTAL-P $\mu\text{g} - \text{ml/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{ml/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{ml/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{ml/l}$	pH	CLD CODE										
		STD	0000	0727	3456	2706	0010144	0000	14795																		
	062	OBS	0000	0727	34560	2706			14795																		
		STD	0010	0732	3457	2705	0010172	0010	14799																		
		STD	0020	0736	3457	2705	0010206	0020	14802																		
		STD	0030	0741	3458	2705	0010234	0031	14806																		
	062	OBS	0045	0748	34590	2705			14811																		
		STD	0050	0774	3465	2706	0010205	0051	14823																		
		STD	0075	0889	3490	2708	0010085	0076	14874																		
		STD	0100	0980	3512	2710	0009948	0101	14915																		
	062	OBS	0107	1002	35179	2711			14924																		
	062	OBS	0116	1027	35246	2712			14936																		
		STD	0125	0978	3518	2715	0009517	0126	14919																		
	062	OBS	0133	0935	35124	2718			14903																		
	062	OBS	0142	0683	34687	2722			14803																		
		STD	0150	0671	3470	2724	0008594	0148	14800																		
		STD	0200	0612	3479	2739	0007235	0188	14786																		
	062	OBS	T0224	0592	34818	2744			14782																		
		STD	0250	0591	3483	2745	0006746	0223	14786																		
		STD	0300	0590	3486	2748	0006574	0256	14794																		
	062	OBS	0368	0588	34894	2751			14805																		
		STD	0400	0575	3490	2753	0006223	0320	14805																		
		STD	0500	0533	3492	2759	0005674	0380	14805																		
	062	OBS	0565	0504	34932	2764			14804																		
		STD	0600	0482	3494	2767	0005015	0433	14801																		
		STD	0700	0431	3494	2773	0004510	0481	14796																		
	062	OBS	0764	0406	34942	2776			14797																		
		STD	0800	0398	3493	2775	0004294	0525	14799																		
		STD	0900	0381	3492	2776	0004260	0568	14808																		
	062	OBS	T0986	0371	34911	2777			14818																		
		STD	1000	0370	3491	2777	0004292	0610	14820																		
		STD	1100	0364	3491	2777	0004305	0653	14834																		
	062	OBS	T1166	0363	34910	2777			14845																		

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT PER	SEA		TYPE	AMT	
31	540	EV	4343 N	04838 W	149	38	04	02	099	1965	001	9252	2688	11	28	4	4		X1	3	5	0018
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS						
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB										
								28	S20	142	011	006	7	14								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	CTC					
		STD	0000	0430	3407	2704	0010281	0000	14669													
099		OBS	0000	0430	34074	2704			14669													
		STD	0010	0586	3437	2709	0009789	0010	14739													
		STD	0020	0692	3458	2712	0009562	0020	14785													
099		OBS	0021	0700	34592	2712			14789													
		STD	0030	0746	3470	2714	0009410	0029	14809													
099		OBS	0032	0755	34718	2714			14814													
		STD	0050	0775	3473	2712	0009629	0048	14824													
		STD	0075	0804	3477	2711	0009778	0072	14840													
		STD	0100	0832	3484	2712	0009716	0097	14856													
		STD	0125	0860	3494	2715	0009444	0121	14872													
099		OBS	0126	0861	34942	2715			14872													
099		OBS	0136	0863	34988	2719			14875													
		STD	0150	0570	3453	2724	0008585	0143	14757													
099		OBS	0168	0418	34380	2730			14695													
099		OBS	0179	0449	34524	2738			14712													
		STD	0200	0443	3461	2745	0006592	0181	14714													
099		OBS	T0237	0432	34666	2751			14717													
		STD	0250	0379	3464	2754	0005744	0212	14696													
099		OBS	0263	0334	34622	2757			14679													
		STD	0300	0361	3470	2761	0005155	0239	14697													
		STD	0400	0414	3486	2768	0004611	0288	14738													
099		OBS	0421	0421	34889	2770			14745													
		STD	0500	0421	3492	2772	0004346	0333	14759													
		STD	0600	0422	3496	2775	0004154	0375	14776													
099		OBS	0625	0422	34963	2775			14780													
		STD	0700	0428	3497	2775	0004265	0418	14796													
		STD	0800	0437	3498	2775	0004409	0461	14816													
099		OBS	0813	0438	34978	2775			14819													
		STD	0900	0395	3493	2776	0004351	0505	14814													
099		OBS	0996	0363	34896	2776			14816													
		STD	1000	0362	3490	2776	0004301	0548	14817													
		STD	1100	0348	3490	2778	0004218	0591	14828													
099		OBS	T1107	0348	34896	2778			14829													

REFERENCE		SHIP CODE	LATITUDE " 1/10	LONGITUDE " 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT				
31	540	EV	4344 N	04847 W		149	38	04	02	126	1965	001	9253	1829	13	26	5	3		X1	3	5		0019			
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS													
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mbs)	DRY BULB	WET BULB	VIS. CODE														
								26	S18	159	033	022	8	10													
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	CTC										
		STD	0000	0030	3355	2694	0011201	0000	14487																		
126		OBS	0000	0030	33551	2694			14487																		
		STD	0010	0044	3357	2695	0011124	0011	14495																		
		STD	0020	0057	3360	2697	0010967	0022	14503																		
		STD	0030	0070	3363	2698	0010812	0033	14511																		
		STD	0050	0097	3371	2703	0010362	0054	14528																		
		STD	0075	0131	3383	2711	0009667	0079	14548																		
		STD	0100	0165	3398	2720	0008767	0102	14570																		
		STD	0125	0199	3416	2732	0007662	0123	14591																		
126		OBS	0135	0212	34236	2737			14600																		
		STD	0150	0265	3438	2744	0006554	0141	14627																		
126		OBS	0162	0297	34469	2749			14644																		
126		OBS	0188	0331	34569	2753			14664																		
		STD	0200	0343	3460	2755	0005644	0171	14672																		
		STD	0250	0386	3470	2758	0005366	0199	14700																		
		STD	0300	0420	3479	2762	0005100	0225	14724																		
126		OBS	T0324	0433	34828	2764			14733																		
		STD	0400	0462	3493	2768	0004629	0273	14759																		
126		OBS	0432	0466	34954	2770			14767																		
		STD	0500	0425	3492	2772	0004386	0319	14760																		
		STD	0600	0382	3489	2774	0004224	0362	14759																		
126		OBS	T0650	0369	34886	2775			14761																		
		STD	0700	0370	3490	2776	0004102	0403	14770																		
		STD	0800	0371	3491	2777	0004131	0444	14787																		
126		OBS	0863	0372	34916	2777			14798																		
		STD	0900	0371	3491	2777	0004217	0486	14804																		
		STD	1000	0367	3491	2777	0004256	0529	14819																		
126		OBS	T1098	0364	34907	2777			14834																		
		STD	1100	0364	3491	2777	0004327	0571	14834																		
		STD	1200	0360	3491	2777	0004363	0615	14849																		
126		OBS	T1294	0357	34907	2778			14864																		



REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRAFT INCHES	MARDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
						10"	1'	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT	
31	540	EV	4355 N	04907 W		149	39	04	02	167	1965	001	9254	0172	01	29	5	4		X0	0		0020	
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB												
									24	514	183	022	017	7									04	
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-2107		$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH							
167		STD	0000	0044	3316	2662	0014285		0000	14487														
		OBS	0000	0044	33156	2662				14487														
		STD	0010	0044	3318	2663	0014138		0014	14489														
		STD	0020	0044	3319	2665	0013998		0028	14491														
		STD	0030	0044	3321	2666	0013851		0042	14493														
167		STD	0050	0043	3325	2669	0013565		0070	14497														
		STD	0075	0043	3330	2673	0013202		0103	14501														
		OBS	0075	0043	33296	2673				14501														
167		STD	0100	0062	3366	2702	0010504		0133	14519														
		OBS	0100	0062	33664	2702				14519														
167		STD	0125	0095	3393	2721	0008683		0157	14542														
		OBS	0140	0122	34047	2729				14558														

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	MARDEN SQUARE 10° 1'	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER								
CTRY CODE	ID. NO.					MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT									
31	540	EV	4359 N	04920 W	149	39	04	02	180	1965	001	9255	0058	00	26	4	4		X1	2	4		0021						
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS															
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB	WET BULB	VIS. CODE																
									25	515	166	022	017										7	02					
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -S μg - at/l	pH											
		STD	0000	0052	3320	2665		0013998		0000	14492																		
180		OBS	0000	0052	33199	2665					14492																		
		STD	0010	0049	3320	2665		0013976		0014	14492																		
		STD	0020	0047	3320	2665		0013961		0028	14493																		
		STD	0030	0044	3320	2665		0013939		0042	14493																		
180		OBS	0035	0043	33201	2666					14493																		

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDEXT INDEXT	MARDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					MO	DAY	HR./10	CRUISE NO.	STATION NUMBER		DIR	HGT			PER	SEA		TYPE		AMT			
										10°							1'	10°			1'	10°		1'
31	540	EV	4439 N	04920 W		149	49	04	02	239	1965	001	9256	0082	00	26	5	2		X0	0		0022	
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB												
									23	514	176	017	006	8									02	
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CC							
239		STD	0000	0012	3312	2661	0014389	0000	14472															
		OBS	0000	0012	33122	2661			14472															
		STD	0010	0013	3315	2663	0014200	0014	14475															
		STD	0020	0014	3317	2665	0014004	0028	14477															
		STD	0030	0015	3320	2667	0013816	0042	14480															
239		STD	0050	0017	3325	2671	0013432	0070	14485															
		OBS	0050	0017	33249	2671			14485															



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR, 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER					SEA	TYPE	AMT		
31	540	EV	4437 N	04905 W		149	49	04	03	015	1965	001	9257	0128	01	23	5	2		X0	0		0023				
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB															
										20	508	196	017	017	7	04											
MESSNGR TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ GYM. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - \text{at/l}$	TOTAL-P $\mu g - \text{at/l}$	NO <sub>2</sub> -N $\mu g - \text{at/l}$	NO <sub>3</sub> -N $\mu g - \text{at/l}$	Si O <sub>4</sub> -Si $\mu g - \text{at/l}$	pH	S C C									
		STD	0000	-0019	3320	2669	0013655		0000	14459																	
015		OBS	0000	-0019	33200	2669				14459																	
		STD	0010	-0020	3320	2669	0013619		0014	14461																	
		STD	0020	-0020	3321	2669	0013590		0027	14462																	
		STD	0030	-0021	3321	2669	0013554		0041	14464																	
015		OBS	0035	-0021	33213	2670				14464																	
		STD	0050	0008	3340	2683	0012236		0067	14483																	
015		OBS	0055	0016	33458	2688				14488																	
		STD	0075	0044	3363	2700	0010664		0095	14506																	
015		OBS	0095	0063	33726	2707				14520																	

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	IO, NO.					10"	1"	MO	DAY	HR, 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE	
31	540	EV	4435 N	04852 W		149	48	04	03	035	1965	001	9258	0420	04	26	4	6		X0	0	0024
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. MM	DIR.	SPEED OR FORCE		DRY BULB	WET BULB										
									20 <td>512</td> <td>200</td> <td>032</td> <td>011</td> <td>7</td> <td>07</td> <td colspan="6"></td>	512	200	032	011	7	07							
MESSNGR TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ GYM. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - \text{at/l}$	TOTAL-P $\mu g - \text{at/l}$	NO <sub>2</sub> -N $\mu g - \text{at/l}$	NO <sub>3</sub> -N $\mu g - \text{at/l}$	Si O <sub>4</sub> -Si $\mu g - \text{at/l}$	pH	S C C				
035		STD	0000	-0018	3323	2671	0013430		0000	14460												
		OBS	0000	-0018	33230	2671				14460												
		STD	0010	-0020	3324	2672	0013341		0013	14461												
		STD	0020	-0022	3327	2674	0013100		0027	14462												
035		OBS	0029	-0024	33301	2677				14463												
		STD	0030	-0023	3331	2678	0012787		0040	14464												
		STD	0050	0005	3348	2690	0011612		0064	14482												
		STD	0075	0043	3367	2703	0010354		0091	14506												
035		OBS	0079	0049	33701	2705				14510												
		STD	0100	0088	3380	2711	0009624		0116	14533												
		STD	0125	0134	3392	2718	0009015		0140	14559												
		STD	0150	0180	3406	2726	0008291		0161	14586												
		STD	0200	0273	3438	2744	0006653		0199	14639												
035		OBS	0227	0323	34579	2755				14668												
035		OBS	T0246	0410	34728	2758				14710												
		STD	0250	0405	3473	2759	0005354		0229	14708												
035		OBS	T0296	0363	34727	2763				14698												
		STD	0300	0364	3473	2763	0004963		0254	14699												
035		OBS	T0395	0392	34827	2768				14728												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DAFT INDCTR	MARDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT PER	SEA		TYPE	AMT					
31	540	EV	4431 N	04839 W		149	48	04	03	054	1965	001	9259	2012	12	20	3	5		X0		0		0025		
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE			DRY BULB	WET BULB													
								20	512	200	022	011	7	09												

MESSNGR TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SI O <sub>4</sub> -Si μg - at/l	pH	S C
		STD	0000	0154	3390	2715	0009288	0000	14547								
054		OBS	0000	0154	33898	2715			14547								
		STD	0010	0176	3397	2719	0008895	0009	14560								
		STD	0020	0198	3405	2723	0008451	0018	14572								
		STD	0030	0219	3412	2727	0008082	0026	14584								
		STD	0050	0259	3425	2734	0007427	0042	14606								
		STD	0075	0307	3440	2742	0006721	0059	14633								
		STD	0100	0351	3454	2749	0006091	0075	14658								
054		OBS	0102	0354	34550	2750			14660								
		STD	0125	0397	3467	2755	0005588	0090	14683								
		STD	0150	0436	3478	2759	0005193	0103	14705								
054		OBS	0182	0471	34890	2764			14727								
		STD	0200	0470	3490	2765	0004716	0128	14730								
		STD	0250	0468	3493	2768	0004510	0151	14737								
		STD	0300	0466	3497	2771	0004303	0173	14745								
054		OBS	T0303	0466	34967	2771			14746								
		STD	0400	0435	3495	2773	0004143	0215	14749								
054		OBS	0402	0434	34954	2773			14748								
		STD	0500	0404	3492	2774	0004124	0257	14752								
		STD	0600	0373	3489	2775	0004105	0298	14755								
054		OBS	T0602	0372	34891	2775			14755								
		STD	0700	0366	3489	2775	0004152	0339	14768								
		STD	0800	0360	3488	2776	0004200	0381	14782								
054		OBS	0804	0360	34884	2776			14783								
		STD	0900	0360	3490	2777	0004168	0423	14799								
		STD	1000	0361	3490	2777	0004258	0465	14816								
054		OBS	T1026	0361	34906	2777			14821								
		STD	1100	0359	3491	2778	0004268	0508	14832								
		STD	1200	0355	3491	2778	0004287	0550	14847								
054		OBS	T1208	0355	34909	2778			14849								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DAFT INDCTR	MARDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4426 N	04756 W	149	47	04	03	100	1965	001	9260	3383	11	25	3	2		X8		6	7	0026
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE			DRY BULB	WET BULB										
									19	509	196	044	028	7	13								

MESSNGR TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SI O <sub>4</sub> -Si μg - at/l	pH	S C
		STD	0000	0880	3501	2718	0008984	0000	14860								
100		OBS	0000	0880	35010	2718			14860								
		STD	0010	0876	3501	2718	0008944	0009	14860								
100		OBS	0019	0871	35005	2719			14859								
		STD	0020	0870	3500	2719	0008947	0018	14859								
100		OBS	0028	0865	34993	2719			14858								
		STD	0030	0865	3499	2719	0008966	0027	14859								
100		OBS	0034	0864	34979	2718			14859								
		STD	0050	0855	3497	2719	0009003	0045	14858								
		STD	0075	0841	3494	2718	0009065	0067	14856								
		STD	0100	0824	3491	2719	0009084	0090	14854								
		STD	0125	0807	3487	2718	0009178	0113	14851								
100		OBS	0135	0799	34857	2718			14849								
100		OBS	0144	0792	34842	2718			14848								
		STD	0150	0785	3483	2718	0009201	0136	14846								
100		OBS	0153	0782	34825	2718			14845								
		STD	0200	0658	3484	2737	0007458	0178	14805								
		STD	0250	0556	3486	2752	0006085	0211	14772								
100		OBS	T0290	0496	34866	2760			14754								
		STD	0300	0487	3487	2761	0005252	0240	14752								
100		OBS	0386	0430	34872	2767			14743								
		STD	0400	0429	3488	2768	0004628	0289	14745								
		STD	0500	0417	3491	2772	0004371	0334	14757								
100		OBS	T0583	0404	34924	2774			14765								
		STD	0600	0399	3492	2775	0004191	0377	14766								
		STD	0700	0375	3490	2775	0004161	0419	14772								
100		OBS	0779	0362	34886	2776			14780								
		STD	0800	0362	3489	2776	0004194	0460	14783								
		STD	0900	0360	3489	2776	0004227	0503	14799								
100		OBS	T0992	0358	34895	2777			14814								
		STD	1000	0359	3490	2777	0004236	0545	14816								
		STD	1100	0369	3492	2778	0004292	0588	14837								
100		OBS	T1150	0377	34931	2778			14849								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH INDEX	MARSDEN SQUARE		STATION TIME IGMT1		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT	
31	540	EV	4417 N	04717 W		149	47	04	03	152	1965	001	9261	3749	12	16	3	2		X0	0		0027	
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mb)	DRY BULB	WET BULB	VIS. CODE											
						03		16	S17	179	128	117	8	10										
MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{at/l}$	pH	S CODE							
145		STD	0000	1082	3539	2713	0009425	0000	14938															
		OBS	0000	1082	35391	2713			14938															
		STD	0010	1082	3539	2713	0009448	0009	14940															
		STD	0020	1081	3539	2713	0009461	0019	14941															
		STD	0030	1080	3539	2713	0009484	0028	14943															
		STD	0050	1079	3539	2713	0009520	0047	14946															
		STD	0075	1078	3539	2713	0009570	0071	14949															
		STD	0100	1077	3538	2714	0009620	0095	14953															
	STD	0125	1075	3538	2714	0009672	0119	14956																
	STD	0150	1074	3538	2714	0009714	0144	14960																
	STD	0200	1071	3538	2714	0009814	0192	14967																
	STD	0250	1068	3537	2714	0009904	0242	14974																
145	OBS	0256	1068	35373	2714				14975															
145	OBS	0265	1066	35375	2715				14976															
145	OBS	0293	1020	35232	2712				14962															
	STD	0300	0961	3515	2715	0009845	0291		14941															
145	OBS	0307	0909	35079	2718				14922															
145	OBS	T0375	0740	34979	2737				14867															
	STD	0400	0707	3498	2741	0007409	0377		14859															
	STD	0500	0595	3498	2756	0006047	0445		14831															
152	OBS	T0594	0516	34976	2766				14814															
	STD	0600	0513	3498	2766	0005131	0500		14814															
	STD	0700	0468	3497	2771	0004763	0550		14812															
152	OBS	0787	0438	34957	2773				14814															
	STD	0800	0435	3496	2774	0004542	0596		14815															
	STD	0900	0413	3495	2775	0004449	0641		14822															
152	OBS	T0999	0397	34936	2776				14832															
	STD	1000	0397	3494	2776	0004423	0686		14832															
	STD	1100	0387	3493	2777	0004422	0730		14844															
152	OBS	T1165	0383	34930	2777				14854															

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DEPTH INDEX	MARSDEN SQUARE		STATION TIME IGMT1		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT			
31	540	EV	4408 N	04637 W		149	46	04	03	196	1965	001	9262	3840	12	14	2	2		X1	6	7			0028	
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. 1m	DIR.	SPEED OR FORCE	(mb)	DRY BULB	WET BULB														
									14	520	142	139	122	8	07											
MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{at/l}$	pH	S CODE									
196		STD	0000	1137	3549	2711	0009660	0000	14959																	
		OBS	0000	1137	35489	2711			14959																	
		STD	0010	1136	3549	2711	0009668	0010	14960																	
		STD	0020	1136	3549	2711	0009700	0019	14962																	
		STD	0030	1135	3549	2711	0009707	0029	14963																	
		STD	0050	1134	3549	2711	0009747	0049	14966																	
		STD	0075	1133	3549	2711	0009798	0073	14970																	
196		STD	0100	1132	3549	2711	0009842	0097	14974																	
		STD	0125	1131	3549	2711	0009894	0122	14977																	
		STD	0150	1130	3548	2712	0009945	0147	14981																	
		STD	0200	1128	3548	2712	0010046	0197	14989																	
		STD	0250	1127	3548	2712	0010165	0247	14996																	
		STD	0300	1126	3548	2712	0010276	0299	15004																	
		OBS	0371	1125	35476	2712			15015																	
196		STD	0400	1125	3548	2712	0010522	0403	15020																	
		OBS	0410	1125	35476	2712			15022																	
		STD	0500	0752	3507	2742	0007553	0493	14894																	
196		OBS	T0561	0582	34902	2752			14835																	
		STD	0600	0561	3492	2756	0006158	0561	14833																	
		STD	0700	0512	3496	2765	0005356	0619	14830																	
196		OBS	0759	0485	34976	2769			14829																	
		STD	0800	0464	3497	2771	0004793	0670	14827																	
		STD	0900	0424	3495	2774	0004553	0717	14827																	
196		OBS	T0978	0402	34937	2776			14830																	
		STD	1000	0397	3493	2776	0004467	0762	14832																	
		STD	1100	0386	3493	2777	0004424	0806	14844																	
196		OBS	T1154	0385	34928	2777			14853																	

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLE	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOO STATION NUMBER
C-REF CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10	CRUISE NO.		STATION NUMBER	OIR.			HGT	PER	SEA	TYPE		AMT		
						WATER	WIND		BARO- METER		AIR TEMP. °C		VIS CODE				SPECIAL OBSERVATIONS							
31	540	EV	4430 N	04555 W	149	45	04	04	042	1965	001	9264	3749	11	16	4	2		X4	7	8		0030	
						COLOR CODE	TRANS. 1m	OIR.	SPEED OF FORCE	BARO- METER (mb)	CRY BULB	WET BULB	VIS CODE	SPECIAL OBSERVATIONS										
								18	S18	044	111	110	6	11										
MESSAGE TIME OF HR 1/10	CAS NO.	CARD TYPE	DEPTH 1m	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D OYN. M. X 10 <sup>3</sup>	SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	Si O <sub>4</sub> -Si μg - dl/l	pH	S C				
		STD	0000	0451	3418	2710		0009684		0000	14679													
042		OBS	0000	0451	34182	2710					14679													
		STD	0010	0467	3422	2712		0009575		0010	14688													
		STD	0020	0475	3426	2714		0009371		0019	14693													
042		OBS	0025	0476	34273	2715					14695													
		STD	0030	0473	3428	2716		0009210		0028	14694													
042		OBS	0039	0468	34300	2718					14694													
		STD	0050	0457	3431	2720		0008836		0046	14691													
		STD	0075	0434	3432	2723		0008546		0068	14686													
		STD	0100	0415	3433	2726		0008299		0089	14682													
042		OBS	0121	0402	34343	2728					14680													
		STD	0125	0401	3434	2729		0008076		0110	14681													
		STD	0150	0395	3435	2730		0007979		0130	14683													
		STD	0200	0384	3437	2732		0007793		0169	14686													
042		OBS	0215	0380	34371	2733					14687													
		STD	0250	0418	3447	2737		0007423		0207	14710													
042		OBS	T0262	0428	34504	2738					14717													
		STD	0300	0443	3467	2750		0006248		0241	14732													
042		OBS	0371	0457	34884	2765					14752													
		STD	0400	0466	3489	2767		0004781		0297	14752													
		STD	0500	0413	3489	2771		0004482		0343	14755													
042		OBS	0584	0392	34893	2773					14760													
		STD	0600	0389	3489	2773		0004272		0387	14762													
		STD	0700	0372	3490	2776		0004105		0429	14771													
042		OBS	0737	0367	34906	2777					14775													
		STD	0800	0366	3491	2777		0004103		0470	14785													
		STD	0900	0362	3491	2777		0004135		0511	14800													
042		OBS	T0946	0360	34907	2777					14807													
		STD	1000	0357	3490	2778		0004183		0552	14815													
		STD	1100	0351	3490	2778		0004232		0594	14829													
042		OBS	T1108	0350	34899	2778					14830													



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	CHART INDEX	MARDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
CTRY CODE	ID. NO.						10"	1"	MO		DAY	HR./10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT			
31	540	EV	4501 N	04553 W		149	55	04	04	04	HR.	1965	001	9265		3596	12	16	5	4		X4	5	8			0031

31	540	EV	4501 N	04553 W	149	55	04	04	092	1965	001	9265		3596	12	16	5	4		X4	5	8		0031
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WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			

			18	S08	037	122	117	6	11	
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MESSAGE TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-2107	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	S CC
		STD	0000	0915	3494	2707	0010052	0000	14872								
	092	OBS	0000	0915	34938	2707			14872								
		STD	0010	0907	3483	2699	0010749	0010	14869								
		STD	0020	0880	3473	2696	0011100	0021	14859								
	092	OBS	0027	0851	3443P	2677P											
		STD	0030	0818	3465	2699	0010796	0032	14837								
		STD	0050	0638	3451	2714	0009435	0053	14768								
	092	OBS	0063	0557	34452	2719			14737								
		STD	0075	0518	3442	2722	0008706	0075	14722								
	092	OBS	0090	0477	34393	2724			14707								
		STD	0100	0474	3440	2725	0008396	0097	14708								
		STD	0125	0467	3443	2728	0008122	0117	14709								
		STD	0150	0462	3446	2731	0007870	0137	14712								
	092	OBS	0191	0458	34533	2737			14718								
		STD	0200	0459	3457	2740	0007066	0175	14720								
		STD	0250	0465	3474	2753	0005910	0207	14733								
		STD	0300	0470	3487	2763	0005057	0234	14745								
	092	OBS	T0318	0472	34897	2765			14750								
		STD	0400	0447	3494	2771	0004383	0282	14753								
	092	OBS	0425	0439	34947	2772			14754								
		STD	0500	0408	3492	2774	0004195	0324	14753								
		STD	0600	0378	3490	2775	0004105	0366	14757								
	092	OBS	T0641	0369	34891	2775			14760								
		STD	0700	0364	3489	2776	0004098	0407	14768								
		STD	0800	0358	3490	2777	0004094	0448	14782								
	092	OBS	0851	0357	34896	2777			14790								
		STD	0900	0359	3490	2777	0004147	0489	14799								
		STD	1000	0364	3491	2778	0004203	0531	14818								
	092	OBS	T1072	0367	34920	2778			14831								
		STD	1100	0366	3492	2778	0004256	0573	14835								
		STD	1200	0356	3491	2778	0004292	0616	14848								
	092	OBS	T1249	0348	34903	2778			14853								

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	CHART INDEX	MARDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.						MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT			
31	540	EV	4531 N	04555 W		149 55	04	04	140	1965	001	9266	3155	11	19	2	2		X4	X	9		0032	

31	540	EV	4531 N	04555 W	149	55	04	04	140	1965	001	9266		3155	11	19	2	2		X4	X	9		0032
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WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			

			20	S08	041	092	061	6	10	
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MESSAGE TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-2107	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	S CC
		STD	0000	0480	3446	2729	0007901	0000	14695								
	140	OBS	0000	0480	34460	2729			14695								
		STD	0010	0476	3446	2730	0007872	0008	14695								
		STD	0020	0471	3446	2730	0007836	0016	14694								
		STD	0030	0467	3446	2731	0007806	0024	14694								
	140	OBS	0047	0459	34457	2731			14694								
		STD	0050	0436	3444	2732	0007641	0039	14684								
	140	OBS	0073	0304	34327	2737			14631								
		STD	0075	0304	3433	2737	0007243	0058	14631								
		STD	0100	0302	3433	2737	0007202	0076	14634								
		STD	0125	0299	3434	2738	0007160	0094	14637								
	140	OBS	0126	0299	34337	2738			14637								
		STD	0148	0560	34802	2747			14756								
		STD	0150	0559	3481	2748	0006363	0111	14756								
		STD	0200	0544	3488	2755	0005726	0141	14759								
		STD	0250	0523	3492	2761	0005241	0168	14760								
	140	OBS	T0296	0501	34950	2766			14759								
		STD	0300	0498	3495	2766	0004783	0193	14758								
		STD	0400	0430	3492	2771	0004340	0239	14746								
	140	OBS	0429	0416	34917	2772			14745								
		STD	0500	0404	3492	2774	0004166	0281	14752								
		STD	0600	0389	3492	2775	0004086	0323	14762								
	140	OBS	T0642	0384	34920	2776			14767								
		STD	0700	0377	3491	2776	0004109	0364	14773								
		STD	0800	0367	3491	2777	0004084	0405	14786								
	140	OBS	0852	0363	34906	2777			14793								
		STD	0900	0360	3491	2778	0004090	0445	14799								
		STD	1000	0356	3491	2778	0004127	0487	14814								
	140	OBS	T1084	0355	34912	2778			14828								



REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES	NDDC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MD		CRUISE NO.	STATION NUMBER			DR.	HGT	PER				SEA
31	540	EV	4529 N	04634 W	149	56	04	04	174	1965	001	9267	3145	12	18	4	4	X2	4 8	0033
				DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-20°		SOUND VELOCITY	D <sub>2</sub> ml/l	PO <sub>4</sub> -P µg - ml/l	TOTAL-P µg - ml/l	NO <sub>2</sub> -N µg - ml/l	NO <sub>3</sub> -N µg - ml/l	SiO <sub>4</sub> -Si µg - ml/l	pH	S C/C		
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE																		
		STD	0000	0454	3442	2729	0007957	0000	14683											
174	OBS	0000	0454	34416	2729				14683											
	STD	0010	0398	3441	2734	0007445	0008		14661											
174	OBS	0010	0398	34410	2734				14661											
	STD	0020	0385	3442	2736	0007289	0015		14658											
	STD	0030	0374	3442	2737	0007155	0022		14655											
	STD	0050	0355	3443	2740	0006923	0036		14650											
174	OBS	0060	0348	34434	2741				14649											
	STD	0075	0345	3445	2742	0006722	0053		14650											
	STD	0100	0340	3447	2744	0006551	0070		14652											
	STD	0125	0335	3449	2746	0006374	0086		14655											
174	OBS	0125	0335	34485	2746				14655											
	STD	0150	0443	3473	2755	0005635	0101		14708											
174	OBS	0150	0443	34731	2755				14708											
174	OBS	0165	0432	34717	2755				14705											
174	OBS	0180	0436	34734	2756				14710											
	STD	0200	0458	3481	2759	0005260	0128		14723											
174	OBS	T0225	0477	34872	2762				14736											
	STD	0250	0476	3490	2764	0004848	0154		14740											
174	OBS	T0298	0475	34925	2767				14748											
	STD	0300	0473	3492	2766	0004718	0178		14747											
174	OBS	0397	0414	34899	2771				14739											
	STD	0400	0414	3490	2771	0004320	0223		14739											
	STD	0500	0399	3490	2773	0004215	0265		14749											
174	OBS	T0596	0387	34909	2775				14760											
	STD	0600	0386	3491	2775	0004127	0307		14761											
	STD	0700	0374	3490	2776	0004135	0348		14772											
174	OBS	0790	0365	34896	2776				14783											
	STD	0800	0365	3490	2776	0004160	0390		14784											
	STD	0900	0360	3490	2777	0004184	0432		14799											
	STD	1000	0355	3490	2777	0004214	0474		14814											
174	OBS	T1003	0355	34897	2777				14814											
	STD	1100	0356	3490	2777	0004298	0516		14831											
174	OBS	T1176	0360	34898	2777				14845											

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES	NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MD		DAY	HR.			CRUISE NO.	STATION NUMBER	DR.				HGT
31	540	EV	4528 N	04718 W	149	57	04	04	217	1965	001	9268	1920	10	14	3	2	X1	3 5	0034
						WATER		WIND		BARO- METER		AIR TEMP. °C		VTL CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS				
						COLD'R CODE	TRANS. (m)	DIR.	SPEED OF FORCE	DRY BULB	WET BULB									
									14	S16	034	067	061	7	14					
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-20°		S Δ D DTN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P µg - ml/l	TOTAL-P µg - ml/l	NO <sub>2</sub> -N µg - ml/l	NO <sub>3</sub> -N µg - ml/l	SIO <sub>4</sub> -Si µg - ml/l	pH	S C/C		
		STD	0000	0550	3437	2714	0009325		0000	14722										
217		OBS	0000	0550	34374	2714				14722										
		STD	0010	0548	3438	2715	0009294		0009	14723										
		STD	0020	0546	3438	2715	0009262		0019	14724										
		STD	0030	0544	3438	2716	0009230		0028	14725										
		STD	0050	0541	3439	2717	0009160		0046	14727										
217		OBS	0070	0537	34396	2717				14729										
		STD	0075	0532	3441	2719	0008941		0069	14728										
217		OBS	0096	0511	34416	2722				14723										
		STD	0100	0495	3440	2723	0008627		0091	14717										
217		OBS	0105	0474	34389	2724				14709										
		STD	0125	0368	3431	2729	0008034		0112	14666										
217		OBS	0125	0368	34306	2729				14666										
217		OBS	0143	0496	34583	2737				14726										
		STD	0150	0507	3462	2739	0007173		0131	14733										
217		OBS	0176	0529	34717	2744				14747										
		STD	0200	0524	3475	2747	0006464		0165	14750										
217		OBS	T0202	0524	34760	2748				14750										
217		OBS	T0224	0539	34854	2753				14761										
		STD	0250	0510	3486	2757	0005535		0195	14754										
		STD	0300	0464	3487	2763	0004989		0221	14743										
217		OBS	0320	0449	34880	2766				14740										
		STD	0400	0428	3490	2770	0004467		0268	14745										
217		OBS	T0476	0412	34916	2773				14751										
		STD	0500	0408	3492	2773	0004233		0312	14753										
		STD	0600	0395	3491	2774	0004205		0354	14764										
217		OBS	0644	0390	34911	2775				14770										
		STD	0700	0387	3491	2775	0004208		0396	14778										
		STD	0800	0379	3491	2776	0004199		0438	14791										
217		OBS	T0836	0376	34913	2776				14796										
		STD	0900	0370	3491	2777	0004205		0480	14804										
		STD	1000	0358	3490	2777	0004254		0522	14815										
217		OBS	T1000	0358	34896	2777				14815										

REFERENCE	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DATE INDEX	MARDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
					10"	1"	MO	DAY		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	

WATER		WIND		BARO- METER (mba)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		15	515	027	080	070	7	09	

MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ D. DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CC
		STD	0000	0198	3413	2730	0007837	0000	14570								
004		OBS	0000	0198	34130	2730			14570								
		STD	0010	0191	3413	2730	0007782	0008	14568								
		STD	0020	0186	3413	2731	0007742	0016	14568								
		STD	0030	0183	3413	2731	0007716	0023	14568								
004		OBS	0043	0182	34135	2731			14570								
		STD	0050	0192	3417	2734	0007509	0039	14576								
		STD	0075	0225	3430	2741	0006778	0056	14596								
		STD	0100	0256	3441	2748	0006222	0073	14616								
		STD	0125	0284	3451	2753	0005723	0088	14633								
		STD	0150	0309	3459	2757	0005362	0101	14649								
004		OBS	0166	0324	34638	2760			14659								
		STD	0200	0353	3470	2762	0004991	0127	14678								
		STD	0250	0384	3478	2765	0004747	0152	14700								
004		OBS	T0294	0402	34829	2767			14716								
		STD	0300	0402	3483	2767	0004608	0175	14717								
		STD	0400	0398	3486	2770	0004436	0220	14732								
004		OBS	0431	0396	34871	2771			14736								
		STD	0500	0384	3488	2773	0004229	0264	14743								
		STD	0600	0371	3488	2774	0004177	0306	14754								
004		OBS	T0650	0366	34886	2775			14760								
		STD	0700	0364	3489	2775	0004142	0347	14768								
		STD	0800	0361	3489	2776	0004187	0389	14783								
004		OBS	0868	0359	34888	2776			14793								
		STD	0900	0359	3489	2776	0004230	0431	14799								
		STD	1000	0358	3489	2776	0004282	0474	14815								
		STD	1100	0357	3490	2777	0004325	0517	14831								
004		OBS	T1103	0357	34896	2777			14832								
		STD	1200	0356	3491	2778	0004321	0560	14848								
		STD	1300	0354	3492	2779	0004305	0603	14864								
004		OBS	T1303	0354	34916	2779			14864								

REFERENCE	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DATE INDEX	MARDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
					10"	1"	MO	DAY		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	

MESSNGR TIME OF	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ D DYN. M. μ - σ <sub>t</sub>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - σ <sub>t</sub> /l	TOTAL-P μg - σ <sub>t</sub> /l	NO <sub>3</sub> -N μg - σ <sub>t</sub> /l	NO <sub>3</sub> -N μm - σ <sub>t</sub> /l	Si O <sub>4</sub> -Si μg - σ <sub>t</sub> /l	pH
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MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ D. DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CC
		STD	0000	0057	3361	2697	0010930	0000	14500								
025		OBS	0000	0057	33605	2697			14500								
		STD	0010	0062	3364	2700	0010688	0011	14504								
		STD	0020	0066	3368	2702	0010446	0021	14508								
		STD	0030	0071	3371	2705	0010206	0032	14512								
025		OBS	0037	0074	33734	2707			14515								
		STD	0050	0136	3400	2724	0008405	0050	14549								
		STD	0075	0215	3433	2745	0006483	0069	14592								
025		OBS	0078	0221	34348	2745			14596								
025		OBS	0097	0242	34407	2748			14609								
		STD	0100	0244	3441	2749	0006093	0085	14610								
		STD	0125	0264	3447	2752	0005852	0100	14624								
		STD	0150	0282	3453	2755	0005594	0114	14637								
025		OBS	0151	0283	34529	2755			14637								
		STD	0200	0322	3463	2759	0005219	0141	14663								
		STD	0250	0353	3471	2762	0004958	0166	14686								
		STD	0300	0376	3477	2765	0004785	0191	14705								
025		OBS	T0333	0387	34807	2767			14715								
		STD	0400	0391	3484	2769	0004510	0237	14729								
025		OBS	0482	0392	34874	2772			14743								
		STD	0500	0390	3487	2772	0004339	0281	14745								
		STD	0600	0381	3488	2773	0004310	0325	14758								
025		OBS	T0651	0376	34878	2774			14764								
		STD	0700	0371	3488	2774	0004265	0368	14770								
		STD	0800	0363	3488	2775	0004261	0410	14784								
025		OBS	0872	0359	34883	2776			14794								
		STD	0900	0359	3488	2776	0004276	0453	14799								
		STD	1000	0358	3489	2776	0004335	0496	14815								
		STD	1100	0357	3489	2776	0004400	0540	14831								
025		OBS	T1114	0357	34886	2776			14834								

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INCHES	MARS DEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
CTRY CODE	ID. NO.					10"	1"	MO	DAY HR, 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA			TYPE	AMT			
31	540	EV	4532 N	04816 W		149	58	04	05	043	1965	001	9271	0713	06	21	5	6		X0	0		0037			
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB														
								20	S26	044	022	011	8	06												
MESSNGR TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>2</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH	NODC						
043		STD	0000	0031	3356	2695		0011161		0000	14487															
		OBS	0000	0031	33557	2695					14487															
		STD	0010	0031	3356	2695		0011169		0011	14489															
		STD	0020	0032	3356	2695		0011177		0022	14491															
043		OBS	0024	0032	33555	2695					14491															
		STD	0030	0050	3364	2700		0010624		0033	14502															
		STD	0050	0104	3388	2716		0009111		0053	14533															
043		OBS	0058	0123	33962	2722					14544															
		STD	0075	0138	3402	2725		0008272		0075	14554															
		STD	0100	0160	3409	2730		0007900		0095	14569															
		STD	0125	0180	3416	2734		0007523		0114	14583															
043		STD	0150	0198	3423	2738		0007140		0133	14596															
		OBS	0174	0215	34283	2741					14608															
		STD	0200	0228	3433	2743		0006646		0167	14619															
		STD	0250	0251	3441	2748		0006264		0199	14638															
		STD	0300	0273	3448	2752		0005962		0230	14657															
043		OBS	T0388	0308	34594	2758					14688															
		STD	0400	0312	3461	2758		0005421		0287	14692															
		STD	0500	0346	3471	2763		0005093		0339	14724															
		STD	0600	0374	3478	2766		0004954		0390	14754															
043		OBS	T0606	0376	34781	2766					14756															

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INCHES	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER									
CTRY CODE	ID. NO.					10"	1"	MO	DAY HR, 1/10			CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA			TYPE	AMT							
31	540	EV	4534 N	04830 W		149	58	04	05	057	1965	001	9272	0210	02	21	5	6		X0	0		0038								
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS															
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB																			
									20	S24	051	011	006	8	05																
MESSNGR TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ D DYN. M. × 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg · ml <sup>-1</sup>	TOTAL-P μg · ml <sup>-1</sup>	NO <sub>2</sub> -N μg · ml <sup>-1</sup>	NO <sub>3</sub> -N μg · ml <sup>-1</sup>	SiO <sub>4</sub> -Si μg · ml <sup>-1</sup>	pH	NODC														
		STD	0000	-0041	3328	2676	0012953	0000	14450																						
057		OBS	0000	-0041	33280	2676			14450																						
		STD	0010	-0041	3330	2677	0012834	0013	14452																						
		STD	0020	-0041	3331	2678	0012716	0026	14454																						
057		OBS	0023	-0041	33315	2679			14454																						
		STD	0030	-0027	3340	2685	0012083	0038	14463																						
057		OBS	0048	0008	33577	2698			14485																						
		STD	0050	0012	3359	2698	0010807	0061	14487																						
		STD	0075	0052	3371	2706	0010099	0087	14511																						
057		OBS	0097	0083	33810	2712			14530																						
		STD	0100	0087	3382	2713	0009466	0112	14533																						
		STD	0125	0114	3391	2718	0008956	0135	14550																						
		STD	0150	0136	3398	2722	0008578	0156	14565																						
057		OBS	T0196	0157	34058	2727			14583																						

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INCHES	MARS DEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR, 1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT
31	540	EV	4534 N	04842 W	149	58	04	05	070	1965	001	9273	0119	01	21	5	5		X0	0		0039	
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB											
								20		S22	051	017	006					7	04				
MESSNGR TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{ml}^{-1}$	TOTAL-P $\mu\text{g} \cdot \text{ml}^{-1}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{ml}^{-1}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{ml}^{-1}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{ml}^{-1}$	pH	NODC			
		STD	0000	-0027	3333	2679		0012643		0000	14457												
070		OBS	0000	-0027	33328	2679					14457												
		STD	0010	-0028	3333	2680		0012603		0013	14458												
		STD	0020	-0030	3334	2680		0012571		0025	14459												
		STD	0030	-0031	3334	2680		0012531		0038	14460												
070		OBS	0043	-0033	33344	2681					14462												
		STD	0050	-0027	3340	2685		0012076		0062	14467												
070		OBS	0061	-0018	33472	2690					14474												
		STD	0075	-0008	3353	2695		0011163		0091	14481												
070		OBS	0095	0005	33541	2695					14491												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BDTDM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER				
CTRY CODE	ID. NO.						10"	1"	MO		DAY	HR.1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT		
31	540	EV	4533 N	04855 W		149	58	04	05	086	1965	001	9274	0073	01	21	4	2		X1	3	2		0040		
							WATER		WIND		BARO- METER		AIR TEMP. °C		ND. OBS. DEPTHS		SPECIAL OBSERVATIONS									
							COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB	VIS. CODE												
										20	522	051	017	006	7	03										
MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P µg - at/l	TOTAL-P µg - at/l	NO <sub>3</sub> -N µg - at/l	ND <sub>3</sub> -N µg - at/l	SiO <sub>4</sub> -Si µg - at/l	pH	S CC								
086		STD	0000	-0033	3317	2666	0013857		0000	14452																
		OBS	0000	-0033	33166	2666				14452																
		STD	0010	-0033	3317	2666	0013853		0014	14454																
		STD	0020	-0033	3317	2666	0013849		0028	14456																
086		STD	0030	-0034	3317	2666	0013842		0042	14457																
		OBS	0030	-0034	33166	2666				14457																
		STD	0050	-0037	3318	2668	0013715		0069	14459																
086		OBS	0060	-0039	33187	2668				14460																

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES	NDDC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA				TYPE
31	540	EV	4621 N	04800 W		149	68	04	05	145	1965	001	9275	0119	01	21	8	3		X1	6	5	0041
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE			DRY BULB	WET BULB										
								24		524	075	033	022	7	04								
MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ×10 <sup>3</sup>		Σ Δ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PD <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>3</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C				
145		STD	0000	-0046	3317	2667		0013790		0000	14446												
		OBS	0000	-0046	33168	2667					14446												
		STD	0010	-0047	3317	2667		0013751		0014	14447												
		STD	0020	-0048	3318	2668		0013704		0027	14449												
145		STD	0030	-0049	3318	2668		0013665		0041	14450												
		OBS	0035	-0050	33183	2668					14450												
		STD	0050	0007	3342	2685		0012079		0067	14482												
		STD	0075	0078	3371	2704		0010248		0095	14523												
145		OBS	0085	0099	33795	2710					14535												
145		OBS	0099	0120	33882	2716					14548												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES	NDDC STATION NUMBER						
CTRY CODE	ID. NO.						10"	1"	MO		DAY	HR.1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT				PER	SEA				
31	540	EV	4619 N	04744 W		149	67	04	05	158	1965	001	9276	0157	01	73	0	4		X1	2	6		0042			
							WATER		WIND		SARD- METER (mb/s)	AIR TEMP. °C		VIS. CODE	ND. DPS. DEPTHS	SPECIAL OBSERVATIONS											
							COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
										23		528	088					028	017	8	04						
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P µg - at/l	TOTAL-P µg - at/l	ND <sub>3</sub> -N µg - at/l	ND <sub>3</sub> -N µg - at/l	Si D <sub>4</sub> -Si µg - at/l	pH	S C								
158		STD	0000	-0020	3334	2679		0012619		0000	14461																
		OBS	0000	-0020	33335	2679					14461																
		STD	0010	-0022	3335	2680		0012530		0013	14461																
		STD	0020	-0024	3336	2681		0012442		0025	14462																
158		STD	0030	-0026	3337	2682		0012353		0037	14463																
		OBS	0034	-0027	33369	2682					14463																
		STD	0050	-0011	3345	2688		0011766		0062	14475																
		STD	0075	0019	3358	2697		0010914		0090	14494																
158		OBS	0087	0036	33641	2701					14505																
		STD	0100	0056	3371	2706		0010120		0116	14517																
		STD	0125	0100	3385	2714		0009321		0141	14543																
158		OBS	0145	0140	33972	2721					14566																



REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DEPT INCHES	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER								
CTRY CODE	ID. NO.					10"	1"	MO	DAY			CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT									
31	540	EV	4616 N	04723 W	149	67	04	05	177	1965	001	9277	0366	02	69	9	7		X1	3	4		0043								
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																			
										22	526	095	033	022	8	08															
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\times 10^3$	$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C														
		STD	0000	-0046	3330	2678	0012788	0000	14448																						
	177	OBS	0000	-0046	33299	2678			14448																						
		STD	0010	-0046	3330	2678	0012761	0013	14450																						
		STD	0020	-0046	3331	2678	0012734	0026	14451																						
	177	OBS	0023	-0046	33306	2678			14452																						
		STD	0030	-0002	3348	2690	0011583	0038	14476																						
	177	OBS	0032	0012	33526	2693			14483																						
	177	OBS	0045	0114	33880	2716			14537																						
		STD	0050	0134	3397	2722	0008619	0058	14548																						
	177	OBS	0059	0167	34128	2732			14566																						
		STD	0075	0189	3420	2736	0007269	0078	14579																						
		STD	0100	0220	3431	2743	0006685	0095	14598																						
		STD	0125	0248	3440	2747	0006245	0111	14616																						
		STD	0150	0274	3448	2752	0005878	0127	14632																						
	177	OBS	0154	0278	34497	2753			14635																						
	177	OBS	T0175	0297	34557	2756			14648																						
		STD	0200	0318	3462	2759	0005256	0154	14662																						
	177	OBS	T0221	0334	34674	2761			14673																						

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DEPT INCHES	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'APLS	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR,1/10	CRUISE NO.			STATION NUMBER		DIR	HGT		PER	SEA		TYPE	AMT	
									HR,1/10						CR	CR									CR
31	540	EV	4614 N	04707 W		149	67	04	05	196	1965	001	9278	1042	10	24	5	2		X1	3	1	0044		
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB														
								24	530	098	033	022	7	09											
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\times 10^3$		$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C							
		STD	0000	0139	3393	2718	0008953		0000	14541															
196		OBS	0000	0139	33929	2718				14541															
		STD	0010	0141	3393	2718	0008959		0009	14543															
		STD	0020	0142	3394	2719	0008896		0018	14546															
		STD	0030	0144	3396	2720	0008758		0027	14549															
196		OBS	0035	0145	33967	2721				14550															
		STD	0050	0174	3407	2727	0008136		0044	14567															
		STD	0075	0217	3422	2736	0007330		0063	14592															
		STD	0100	0254	3436	2744	0006583		0080	14614															
		STD	0125	0286	3447	2750	0006042		0096	14633															
		STD	0150	0312	3457	2755	0005540		0111	14650															
196		OBS	0181	0336	34653	2760				14667															
		STD	0200	0342	3466	2760	0005186		0137	14672															
		STD	0250	0359	3473	2764	0004865		0163	14689															
196		OBS	0251	0359	34735	2764				14689															
196		OBS	0291	0418	34865	2768				14722															
		STD	0300	0415	3487	2769	0004448		0186	14723															
		STD	0400	0388	3487	2772	0004254		0229	14728															
196		OBS	T0407	0387	34874	2772				14729															
		STD	0500	0376	3488	2773	0004165		0271	14739															
		STD	0600	0367	3488	2775	0004141		0313	14752															
196		OBS	0620	0366	34880	2775				14755															
		STD	0700	0362	3488	2775	0004143		0354	14767															
		STD	0800	0359	3489	2776	0004172		0396	14782															
196		OBS	T0835	0358	34887	2776				14787															
		STD	0900	0356	3489	2776	0004214		0438	14797															
		STD	1000	0355	3489	2776	0004293		0480	14814															
196		OBS	T1000	0355	34886	2776				14814															



REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.						10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4613 N	04650 W		149	66	04	05	215	1965	001 9279	1218	12	24	5	2		X0	X	0	0045		
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
COLOR CODE	TRANS. (m)					DIR.	SPEED OR FORCE	DRY BULB	WET BULB															
										24	S29	102	039	028	8	09								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S NO C						
		STD	0000	0207	3415	2731	0007721		0000	14574														
215		OBS	0000	0207	34154	2731				14574														
		STD	0010	0209	3416	2731	0007716		0008	14577														
		STD	0020	0211	3416	2731	0007719		0015	14579														
215		OBS	0022	0211	34160	2731				14580														
		STD	0030	0218	3419	2733	0007545		0023	14584														
215		OBS	0035	0223	34214	2735				14588														
		STD	0050	0245	3429	2739	0007010		0038	14601														
		STD	0075	0278	3440	2745	0006468		0054	14621														
		STD	0100	0307	3450	2750	0005985		0070	14639														
		STD	0125	0333	3459	2755	0005565		0084	14655														
215		OBS	0145	0350	34649	2758				14667														
		STD	0150	0353	3466	2759	0005250		0098	14669														
		STD	0200	0380	3475	2763	0004885		0123	14690														
		STD	0250	0398	3481	2766	0004667		0147	14706														
215		OBS	0271	0403	34837	2768				14712														
		STD	0300	0398	3485	2769	0004416		0170	14715														
		STD	0400	0384	3487	2772	0004212		0213	14726														
215		OBS	T0459	0377	34878	2773				14733														
		STD	0500	0374	3488	2774	0004121		0255	14738														
		STD	0600	0367	3488	2775	0004133		0296	14752														
215		OBS	0691	0362	34888	2776				14765														
		STD	0700	0362	3489	2776	0004105		0337	14767														
		STD	0800	0361	3489	2776	0004150		0378	14783														
		STD	0900	0359	3490	2777	0004189		0420	14799														
215		OBS	T0977	0356	34898	2777				14810														
		STD	1000	0355	3490	2777	0004189		0462	14814														
		STD	1100	0350	3490	2778	0004212		0504	14828														
215		OBS	T1189	0345	34905	2779				14841														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME IGMT		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4618 N	04631 W		149	66	04	06	013	1965	001 9280	1060	11	23	5	5		X0		0		0046
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
COLOR CODE		TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB																	
						22	S23			129	039	028	8	08									
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - \text{at/l}$	TOTAL-P $\mu g - \text{at/l}$	NO <sub>2</sub> -N $\mu g - \text{at/l}$	NO <sub>3</sub> -N $\mu g - \text{at/l}$	SiO <sub>4</sub> -Si $\mu g - \text{at/l}$	pH	S NO C					
013		STD	0000	0326	3446	2745	0006414		0000	14630													
		OBS	0000	0326	34456	2745				14630													
		STD	0010	0324	3448	2747	0006227		0006	14631													
		STD	0020	0323	3450	2749	0006069		0012	14632													
		STD	0030	0321	3452	2750	0005911		0018	14634													
013		STD	0050	0318	3456	2754	0005596		0030	14636													
		OBS	0069	0315	34594	2757				14638													
		STD	0075	0320	3461	2758	0005256		0044	14642													
		STD	0100	0337	3465	2759	0005131		0057	14654													
		STD	0125	0353	3470	2762	0004928		0069	14665													
013		STD	0150	0366	3474	2764	0004776		0081	14675													
		STD	0200	0386	3480	2766	0004571		0105	14693													
		OBS	0205	0387	34808	2767				14694													
		STD	0250	0396	3485	2769	0004347		0127	14706													
		OBS	T0285	0399	34875	2771				14713													
013		STD	0300	0395	3488	2771	0004197		0148	14714													
		STD	0400	0375	3488	2774	0004064		0190	14722													
		OBS	0461	0366	34878	2775				14729													
		STD	0500	0362	3488	2775	0003992		0230	14733													
		STD	0600	0355	3489	2777	0003929		0269	14747													
013		OBS	T0699	0351	34896	2777				14762													
		STD	0700	0351	3490	2778	0003895		0309	14762													
		STD	0800	0352	3491	2779	0003913		0348	14779													
		STD	0900	0353	3491	2778	0004006		0387	14796													
		OBS	T0939	0353	34913	2779				14803													
013		STD	1000	0354	3491	2779	0004074		0428	14814													
		OBS	1060	0355	34914	2779				14824													

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDEXT	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER									
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT								
31	540	EV	4619 N	04548 W		149	65	04	06	048	1965	001	9281	0421	04	21	8	3		XO	0		0047								
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																			
								26 528		135	039	028	8	05																	
MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ θ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>3</sub> -N μg - at/l	NO <sub>2</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CODE														
		STD	0000	0374	3440	2736	0007279	0000	14650																						
048		OBS	0000	0374	34400	2736			14650																						
		STD	0010	0374	3440	2736	0007263	0007	14651																						
		STD	0020	0374	3441	2736	0007254	0015	14653																						
		STD	0030	0373	3441	2736	0007237	0022	14654																						
		STD	0050	0373	3441	2737	0007212	0036	14657																						
		STD	0075	0372	3442	2738	0007174	0054	14661																						
		STD	0100	0371	3443	2738	0007143	0072	14665																						
048		OBS	0111	0371	34429	2738			14667																						
		STD	0125	0391	3456	2747	0006353	0089	14679																						
048		OBS	0142	0410	34688	2755			14692																						
		STD	0150	0410	3471	2757	0005445	0104	14694																						
		STD	0200	0408	3481	2765	0004723	0129	14702																						
		STD	0250	0400	3488	2771	0004164	0151	14708																						
048		OBS	0256	0399	34881	2771			14709																						
		STD	0300	0387	3488	2773	0004046	0172	14711																						
048		OBS	10367	0362	34889	2776			14712																						

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDEXT	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT				
31	540	EV	4622 N	04504 W		149	65	04	06	082	1965	001	9282	0869	09	23	4	2		XO	0		0048				
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB															
									23	518	149	039	022	8	07												
MESSAGE TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$	$\Sigma \Delta \theta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{at/l}$	pH	S CODE										
082		STD	0000	0404	3444	2736	0007246	0000	14663																		
		OBS	0000	0404	34443	2736			14663																		
		STD	0010	0403	3444	2736	0007244	0007	14664																		
		STD	0020	0402	3444	2736	0007241	0014	14665																		
		STD	0030	0400	3444	2736	0007239	0022	14666																		
082		STD	0050	0398	3444	2737	0007232	0036	14668																		
		STD	0075	0395	3444	2737	0007233	0054	14671																		
		STD	0100	0392	3444	2737	0007225	0072	14674																		
		OBS	0123	0389	34442	2738			14677																		
		STD	0125	0391	3446	2739	0007104	0090	14678																		
082		STD	0150	0416	3465	2751	0005957	0107	14695																		
		OBS	10178	0438	34826	2763			14711																		
		STD	0200	0433	3484	2765	0004764	0133	14713																		
		STD	0250	0423	3487	2768	0004483	0157	14718																		
		STD	0300	0413	3489	2771	0004276	0178	14722																		
082		STD	0400	0395	3491	2774	0004031	0220	14731																		
		OBS	0404	0394	34911	2774			14731																		
		STD	0500	0379	3490	2775	0004003	0260	14741																		
		STD	0600	0363	3489	2776	0003989	0300	14751																		
		OBS	10602	0363	34894	2776			14751																		
082		STD	0700	0360	3490	2777	0004029	0340	14766																		
		STD	0800	0357	3490	2777	0004062	0381	14781																		
		OBS	10815	0356	34897	2777			14783																		
082		OBS	0862	0355	34897	2777			14791																		

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDEXT	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT		
31	540	EV	4700 N	04452 W		149	74	04	06	133	1965	001	9283	0147	01	23	7	4		X1	8	6		0049	
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB													
									29	519	166	039	028	7	04										
MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	S Δ θ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>3</sub> -N μg - at/l	NO <sub>2</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CODE								
133		STD	0000	0379	3443	2738	0007079	0000	14652																
		OBS	0000	0379	34433	2738			14652																
		STD	0010	0378	3443	2738	0007078	0007	14653																
		STD	0020	0378	3443	2738	0007086	0014	14655																
		STD	0030	0377	3443	2738	0007086	0021	14656																
133		STD	0050	0375	3443	2738	0007091	0035	14659																
		OBS	0059	0374	34432	2738			14660																
		STD	0075	0372	3444	2739	0007034	0053	14661																
133		STD	0100	0368	3445	2740	0006942	0071	14664																
		OBS	0123	0364	34457	2741			14666																
		STD	0125	0365	3446	2741	0006848	0088	14667																
133		OBS	0138	0374	34489	2743			14673																

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10	CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA			

WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		27	S10	166	039	028	7	04	

MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{dl/l}$	TOTAL-P $\mu\text{g} \cdot \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{dl/l}$	pH	S CC
		STD	0000	0384	3443	2737	0007142	0000	14654								
173		OBS	0000	0384	34431	2737			14654								
		STD	0010	0384	3443	2737	0007143	0007	14656								
		STD	0020	0383	3443	2737	0007142	0014	14657								
		STD	0030	0382	3443	2738	0007134	0021	14658								
		STD	0050	0381	3443	2738	0007134	0036	14661								
173		OBS	0058	0380	34434	2738			14662								
		STD	0075	0378	3444	2738	0007111	0053	14664								
		STD	0100	0375	3444	2739	0007079	0071	14667								
173		OBS	0121	0372	34441	2739			14669								
		STD	0125	0373	3445	2740	0007001	0089	14670								
		STD	0150	0382	3452	2744	0006586	0106	14679								
173		OBS	0169	0394	34606	2750			14689								

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10	CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA			

WATER		WIND		BARO-		AIR TEMP. °C		VIS.		NO. OF OBS. DEPTHS		SPECIAL OBSERVATIONS	
COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	METER (mb)		DRY BULB	WET BULB	CODE					
		27	S10	169		028	017	7	04				

MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{dl/l}$	TOTAL-P $\mu\text{g} \cdot \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{dl/l}$	pH	S CC
		STD	0000	0358	3442	2739	0006963	0000	14643								
184		OBS	0000	0358	34422	2739			14643								
		STD	0010	0359	3443	2739	0006938	0007	14645								
		STD	0020	0361	3444	2740	0006907	0014	14648								
		STD	0030	0362	3444	2740	0006882	0021	14650								
		STD	0050	0365	3445	2741	0006827	0034	14655								
		STD	0075	0368	3447	2742	0006759	0051	14660								
		STD	0100	0371	3449	2743	0006686	0068	14666								
		STD	0125	0375	3450	2744	0006619	0085	14672								
184		OBS	0127	0375	34504	2744			14672								
184		OBS	0137	0395	34605	2750			14684								
		STD	0150	0397	3470	2757	0005389	0100	14688								
184		OBS	T0183	0403	34760	2761			14697								

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10	CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA			

WATER		WIND		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mb)	DRY BULB				WET BULB
		24	S07	169	028	017	7	05	

MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{dl/l}$	TOTAL-P $\mu\text{g} \cdot \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{dl/l}$	pH	S CC
199		STD	0000	0364	3442	2738	0007072	0000	14646								
		OBS	0000	0364	34415	2738			14646								
		STD	0010	0363	3442	2738	0007073	0007	14647								
		STD	0020	0362	3442	2738	0007074	0014	14648								
		STD	0030	0362	3441	2738	0007082	0021	14649								
		STD	0050	0360	3441	2738	0007084	0035	14652								
		STD	0075	0358	3441	2738	0007093	0053	14655								
199	OBS	0076	0358	34413	2738			14655									
		STD	0100	0351	3443	2740	0006938	0071	14656								
		STD	0125	0343	3444	2742	0006780	0088	14657								
199	OBS	0125	0343	34441	2742			14657									
		STD	0150	0389	3465	2754	0005680	0103	14684								
199	OBS	0176	0418	34802	2763			14702									
		STD	0200	0411	3481	2765	0004744	0129	14704								
		STD	0250	0398	3483	2768	0004491	0153	14707								
199	OBS	T0252	0397	34834	2768			14707									

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	IO, NO.						10"	1"	MO		DAY	HR.1/10			CRUISE NO.	STATION NUMBER	DIR.		HGT	PER		SEA	TYPE	AMT			
31	540	EV	4659 N	04549 W		149	65	04	06	217	1965	001	9287		0280	03	24	4	4		X1	3	6				0053
							WATER		WIND		BARO- METER (mbars)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
							COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
										27	502	166	028	011	7		06										
MESSNGR TIME HR. 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta \theta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH										
		STD	0000	0358	3442	2739	0006978		0000	14643																	
217		OBS	0000	0358	34420	2739				14643																	
		STD	0010	0356	3443	2740	0006892		0007	14644																	
		STD	0020	0354	3444	2741	0006799		0014	14645																	
		STD	0030	0352	3445	2742	0006713		0021	14646																	
		STD	0050	0348	3447	2744	0006534		0034	14648																	
		STD	0075	0343	3450	2747	0006319		0050	14650																	
		STD	0100	0338	3452	2749	0006096		0065	14652																	
217		OBS	0100	0338	34523	2749				14652																	
217		OBS	0120	0391	34650	2754				14680																	
		STD	0125	0389	3465	2754	0005642		0080	14680																	
		STD	0150	0382	3466	2756	0005512		0094	14681																	
217		OBS	0150	0382	34663	2756				14681																	
		STD	0200	0409	3479	2763	0004884		0120	14702																	
217		OBS	0215	0411	34818	2765				14706																	
		STD	0250	0405	3485	2768	0004441		0143	14710																	
217		OBS	T0280	0389	34856	2770				14708																	

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDIC	MARSSEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	IO. NO.						10"	1"	MO		DAY	HR./1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT
31	540	EV	4701 N	04606 W		149	76	04	06	233	1965	001	9288	0334	03	24	1	4		X1	3	6	0054	
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS		SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbars)	DRY BULB	WET BULB												
									27	502	163	039	022						8	05				
MESSNGR TIME HR. 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta \theta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH							
233		STD	0000	0363	3443	2739	0006980		0000	14645														
		OBS	0000	0363	34426	2739				14645														
		STD	0010	0355	3444	2741	0006808		0007	14644														
		STD	0020	0349	3444	2741	0006760		0014	14643														
		STD	0030	0343	3445	2743	0006637		0020	14642														
233		STD	0050	0334	3447	2745	0006419		0033	14642														
		OBS	0062	0330	34481	2747				14642														
		STD	0075	0330	3449	2747	0006242		0049	14644														
233		STD	0100	0329	3451	2749	0006113		0065	14648														
		OBS	0118	0329	34524	2750				14651														
		STD	0125	0341	3456	2752	0005866		0080	14658														
		STD	0150	0376	3466	2756	0005475		0094	14679														
233		OBS	T0178	0406	34758	2761				14667														
		STD	0200	0401	3478	2763	0004897		0120	14699														
		STD	0250	0389	3482	2768	0004503		0143	14703														
		STD	0300	0378	3486	2772	0004108		0165	14707														
233		OBS	0334	0370	34892	2775				14710														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSSEN SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	IO. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4700 N	04619 W		149	76	04	07	008	1965	001	9289	0328	03	24	1	4		X1	4	3	0055
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbars)	DRY BULB	WET BULB											
									00	500	166	022	011	8	04								
MESSNGR TIME HR. 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta \theta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH					
008		STD	0000	0351	3463	2756		0005316		0000	14643												
		OBS	0000	0351	34632	2756					14643												
		STD	0010	0353	3464	2757		0005285		0005	14646												
		STD	0020	0356	3465	2757		0005263		0011	14648												
		STD	0030	0358	3466	2758		0005233		0016	14651												
		STD	0050	0363	3467	2758		0005175		0026	14657												
		STD	0075	0369	3469	2759		0005110		0039	14664												
008		STD	0100	0374	3471	2760		0005047		0052	14670												
		STD	0125	0380	3473	2761		0004977		0064	14677												
	008	OBS	0128	0381	34731	2761					14678												
	008	OBS	0143	0402	34796	2764					14690												
		STD	0150	0401	3480	2765		0004682		0076	14691												
		STD	0200	0393	3482	2768		0004458		0099	14696												
		STD	0250	0384	3485	2770		0004238		0121	14701												
008		STD	0300	0376	3487	2773		0004018		0142	14706												
		OBS	T0328	0371	34886	2775					14709												



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	ORBIT INDIC	MARS DEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10			CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

31	540	EV	4700 N	04633 W		149	76	04	07	022	1965	001	9290		0732	07	24	2	4		X1	4	4	0056
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WATER		WIND		AIR TEMP. °C		BARO- METER (mb)	DRY BULB		WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE									

			00	500	169		022	011	8	05		
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MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - at/l$	TOTAL-P $\mu g - at/l$	NO <sub>3</sub> -N $\mu g - at/l$	NO <sub>2</sub> -N $\mu g - at/l$	SiO <sub>4</sub> -Si $\mu g - at/l$	pH	S C
022	OBS	STD	0000	0368	3465	2756	0005355	0000	14650								
		OBS	0000	0368	34648	2756			14650								
		STD	0010	0368	3465	2757	0005321	0005	14652								
		STD	0020	0367	3466	2757	0005288	0011	14653								
		STD	0030	0367	3466	2757	0005254	0016	14655								
		STD	0050	0366	3467	2758	0005187	0026	14658								
		STD	0075	0364	3469	2759	0005099	0039	14662								
		STD	0100	0363	3470	2761	0005018	0052	14665								
		STD	0125	0362	3471	2762	0004930	0064	14669								
		STD	0150	0361	3472	2763	0004849	0077	14673								
022	OBS	OBS	0160	0360	34728	2763			14674								
		STD	0192	0402	34826	2767			14699								
022	STD	STD	0200	0401	3483	2767	0004500	0100	14700								
		STD	0250	0393	3485	2770	0004315	0122	14705								
		STD	0300	0386	3486	2771	0004215	0143	14710								
		STD	0400	0374	3488	2774	0004031	0184	14722								
		OBS	T0426	0371	34886	2775			14725								
022	STD	STD	0500	0365	3489	2775	0003965	0224	14735								
		STD	0600	0359	3489	2776	0003972	0264	14749								
022	OBS	OBS	T0675	0357	34892	2777			14760								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	ORBIT INDIC	MARS DEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10			CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

31	540	EV	4700 N	04647 W		149	76	04	07	038	1965	001	9291		1152	10	00	0	X		X0	0		0057
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WATER		WIND		AIR TEMP. °C		BARO- METER (mb)	DRY BULB		WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE									

			00	500	163		017	011	8	09		
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MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - at/l$	TOTAL-P $\mu g - at/l$	NO <sub>3</sub> -N $\mu g - at/l$	NO <sub>2</sub> -N $\mu g - at/l$	SiO <sub>4</sub> -Si $\mu g - at/l$	pH	S C
038	OBS	STD	0000	0349	3459	2753	0005629	0000	14641								
		OBS	0000	0349	34588	2753			14641								
		STD	0010	0350	3459	2753	0005611	0006	14643								
		STD	0020	0350	3460	2754	0005586	0011	14645								
		STD	0030	0350	3460	2754	0005569	0017	14647								
038	STD	STD	0050	0351	3461	2755	0005526	0028	14651								
		OBS	0065	0352	34617	2755			14654								
		STD	0075	0333	3461	2757	0005345	0041	14647								
		OBS	0079	0326	34613	2757			14645								
		STD	0100	0334	3463	2758	0005254	0055	14652								
038	STD	STD	0125	0344	3466	2759	0005139	0068	14661								
		STD	0150	0353	3470	2762	0004951	0080	14669								
		OBS	0173	0362	34743	2764			14678								
		OBS	0197	0386	34803	2767			14692								
		STD	0200	0386	3481	2767	0004496	0104	14693								
038	STD	STD	0250	0386	3484	2770	0004318	0126	14702								
		STD	0300	0385	3486	2771	0004204	0147	14710								
		OBS	T0395	0382	34893	2774			14725								
		STD	0400	0382	3489	2774	0004019	0188	14726								
		STD	0500	0373	3489	2775	0004006	0229	14738								
38	OBS	OBS	T0594	0367	34894	2776			14751								
		STD	0600	0367	3489	2776	0004029	0269	14752								
		STD	0700	0361	3490	2777	0004020	0309	14766								
038	OBS	OBS	0793	0357	34901	2777			14780								
		STD	0800	0357	3490	2777	0004045	0349	14781								
		STD	0900	0353	3490	2778	0004084	0390	14796								
038	STD	STD	1000	0350	3490	2778	0004131	0431	14812								
		OBS	T1012	0350	34898	2778			14814								



REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDIC	MARS SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT	
						WATER COLOR CODE	WIND TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mbs)	AIR TEMP. °C DRY BULB													WET BULB
31	540	EV	4700 N	04700 W		149	77	04	07	064	1965	001	9292		1088	10	00	0	X		X0	0		0058

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDIC	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER							
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA			TYPE	AMT					
						WATER COLOR CODE	WIND TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mbs)	AIR TEMP. °C DRY BULB															WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
31	540	EV	4700 N	04714 W		149	77	04	07	083	1965	001	9293		0612	06	24	4	4		X2	6	8				0059		

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DAFT INCHES	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT		
31	540	EV	4700 N	04800 W		149	78	04	07	124	1965	001	9296		0144	01	04	2	4		X4	5	8		0062
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. m	DIR.	SPEED OF FORCE	DRY BULB		WET BULB													
								02	S02	173	022	011	5					07							
MESSNGR TIME OF HR	1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME AND MALT-10 <sup>3</sup>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	D <sub>2</sub> m/l	PD <sub>4</sub> -P μg - α/l	TOTAL-P μg - α/l	NO <sub>2</sub> -N μg - α/l	NO <sub>3</sub> -N μg - α/l	Si O <sub>4</sub> -Si μg - α/l	pH	Σ C					
			STD	0000	-0058	3307	2660		0014503		0000	14439													
124			OBS	0000	-0058	33069	2660					14439													
			STD	0010	-0060	3307	2660		0014483		0014	14440													
			STD	0020	-0063	3307	2660		0014460		0029	14440													
			STD	0030	-0067	3307	2660		0014433		0043	14440													
124			OBS	0035	-0069	33073	2660					14440													
			STD	0050	-0077	3310	2663		0014195		0072	14439													
124			OBS	0050	-0077	33097	2663					14439													
			STD	0075	-0073	3325	2675		0013027		0106	14447													
124			OBS	0075	-0073	33250	2675					14447													
124			OBS	0090	-0040	33376	2684					14467													
			STD	0100	-0024	3346	2690		0011616		0137	14477													
			STD	0125	0034	3366	2703		0010377		0164	14511													
124			OBS	0125	0034	3380P	2714P																		
124			OBS	0135	0064	33744	2708					14527													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT MO/CTH	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE		AMT
31	540	EV	4410 N	04842 W	149	48	04	09	024	1965	CKS	9297	0896	08	34	2	4		X1	5	3		0063
						WATER		WIND				AIR TEMP. °C											
						COLOR CODE	TRANS. 1m1	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
									33	S12	234	000	-006	8	07								

MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	ST C
024	STD	0000	0000	-0033	3323	2672	0013367	0000	14453								
	OBS	0000	0000	-0033	33230	2672			14453								
	STD	0010	0010	-0026	3330	2677	0012858	0013	14459								
	STD	0020	0020	-0018	3337	2682	0012354	0026	14465								
	STD	0030	0030	-0009	3343	2687	0011933	0038	14472								
024	OBS	0047	0006	0006	33538	2695			14483								
	STD	0050	0011	0011	3356	2696	0011031	0061	14486								
	STD	0075	0053	0371	2706		0010105	0087	14512								
	STD	0100	0092	0385	2715		0009269	0111	14535								
	STD	0125	0129	0399	2724		0008449	0134	14558								
024	STD	0150	0162	0411	2731		0007777	0154	14578								
	STD	0200	0222	0431	2742		0006748	0190	14616								
	OBS	0211	0233	04352	2745				14623								
	STD	0250	0264	0445	2750		0006077	0222	14644								
	STD	0300	0300	0455	2755		0005685	0252	14669								
024	OBS	T0366	0338	04670	2761				14698								
	STD	0400	0354	0471	2762		0005093	0306	14711								
	STD	0500	0386	0481	2767		0004773	0355	14743								
024	OBS	T0542	0393	04832	2768				14753								
	STD	0600	0391	0485	2770		0004622	0402	14762								
024	OBS	0676	0388	04868	2772				14773								
	STD	0700	0387	0487	2772		0004534	0448	14777								
024	STD	0800	0384	0487	2772		0004583	0493	14792								
	OBS	T0804	0384	04869	2772				14793								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT MO/CTH	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE		AMT
31	540	EV	4346 N	04840 W	149	38	04	11	119	1965	CKS	9298	1829	13	13	2	4		X4	X	9	0064	
						WATER		WIND				AIR TEMP. °C											
						COLOR CODE	TRANS. 1m1	DIR.	SPEED OR FORCE	BARO- METER (mbs)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
									12	S13	071	061	061	1	08								

MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	ST C
119	STD	0000	0103	0103	3355	2690	0011640	0000	14520								
	OBS	0000	0103	0103	33546	2690			14520								
	STD	0010	0102	0102	3361	2695	0011147	0011	14522								
	STD	0020	0101	0101	3366	2699	0010761	0022	14523								
	STD	0030	0100	0100	3372	2704	0010299	0033	14525								
119	OBS	0037	0099	03759	2707				14527								
	STD	0050	0119	0384	2712		0009509	0053	14539								
	STD	0075	0154	0398	2721		0008685	0075	14561								
	STD	0100	0187	0410	2728		0008020	0096	14581								
	STD	0125	0217	0422	2736		0007353	0116	14600								
119	STD	0150	0245	0433	2742		0006762	0133	14618								
	STD	0200	0292	0451	2752		0005844	0165	14649								
	OBS	T0225	0311	04582	2756				14662								
	STD	0250	0319	0461	2758		0005378	0193	14670								
	STD	0300	0334	0465	2760		0005261	0219	14685								
119	STD	0400	0358	0473	2764		0004985	0271	14713								
	OBS	0444	0366	04764	2766				14724								
	STD	0500	0375	0480	2767		0004728	0319	14738								
	STD	0600	0385	0486	2771		0004480	0365	14759								
	OBS	0664	0387	04878	2772				14771								
119	STD	0700	0382	0488	2773		0004389	0410	14775								
	STD	0800	0371	0488	2774		0004352	0453	14787								
	OBS	0884	0365	04885	2775				14798								
	STD	0900	0365	0489	2776		0004297	0496	14801								
	STD	1000	0366	0490	2776		0004318	0540	14818								
119	STD	1100	0367	0490	2776		0004413	0583	14836								
	OBS	T1124	0367	04905	2777				14840								
	STD	1200	0366	0491	2777		0004443	0627	14852								
119	STD	1300	0363	0491	2777		0004475	0672	14868								
	OBS	T1321	0362	04908	2777				14871								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARS SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH OF BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4347 N	04846 W		149	38	04	11	147	1965	CKS	9299	0759	04	13	2	2		X4	4	8	0065
						WATER		WIND		AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	BARO- METER (mbs)	DRY BULB	WET BULB											
									16	S10	003	050	044	1	06								
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH						
147		STD	0000	0022	3332	2676	0012963		0000	14480													
		OBS	0000	0022	33315	2676				14480													
		STD	0010	0035	3339	2681	0012453		0013	14488													
147		STD	0020	0044	3354	2693	0011362		0025	14496													
		OBS	0020	0044	33539	2693				14496													
		STD	0030	0046	3380	2714	0009384		0035	14502													
147		OBS	0040	0048	34028	2732				14508													
		STD	0050	0060	3404	2732	0007633		0052	14515													
		STD	0075	0089	3406	2732	0007654		0071	14533													
147		STD	0100	0115	3409	2733	0007594		0090	14549													
		STD	0125	0138	3412	2733	0007525		0109	14564													
		STD	0150	0159	3415	2734	0007453		0128	14578													
147		OBS	0198	0191	34203	2736				14600													
		STD	0200	0192	3421	2737	0007264		0165	14601													
		STD	0250	0207	3426	2740	0007026		0200	14617													
147		OBS	0297	0226	34326	2743				14634													
		STD	0300	0227	3433	2744	0006687		0235	14635													
147		OBS	T0396	0277	34497	2753				14675													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT.	PER	SEA		TYPE	AMT		
31	540	EV	4355 N	04907 W		149	39	04	11	169	1965	CKS	9300	0165	02	11	3	4		X4	4	8		0066
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	(mbs)	DRY BULB	WET BULB												
									16	S10	997	072	072	0	08									
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta$ D DYN. M. x 10 <sup>3</sup>		SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CC					
		STD	0000	0070	3315	2660	0014452		0000		14499													
169		OBS	0000	0070	33152	2660					14499													
		STD	0010	0052	3315	2661	0014355		0014		14493													
169		OBS	0010	0052	33152	2661					14493													
169		OBS	0015	0000	33200	2668					14470													
		STD	0020	-0002	3321	2669	0013647		0028		14470													
		STD	0030	-0004	3325	2672	0013338		0042		14472													
169		OBS	0030	-0004	33249	2672					14472													
169		OBS	0040	-0005	33322	2678					14474													
		STD	0050	-0003	3335	2680	0012566		0068		14477													
		STD	0075	0002	3346	2689	0011722		0098		14485													
169		OBS	0075	0002	33463	2689					14485													
		STD	0100	0050	3367	2703	0010421		0126		14514													
169		OBS	0100	0050	33666	2703					14514													
		STD	0125	0057	3370	2705	0010194		0152		14522													
		STD	0150	0064	3374	2707	0009961		0177		14529													
169		OBS	T0160	0067	33751	2708					14533													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARS SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT.	PER	SEA		TYPE	AMT	
31	540	EV	4400 N	04919 W	149	49	04	11	188	1965	CKS	9301	0038	00	14	3	4		X4	4	8	0067	
						WATER		WIND		AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	BARO- METER (mbs)	DRY BULB	WET BULB											
									36	S10	973	050	050	7	02								
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CC					
		STD	0000	0059	3314	2659	0014523		0000	14494													
188		OBS	0000	0059	33135	2659				14494													
		STD	0010	0054	3313	2660	0014502		0015	14493													
		STD	0020	0049	3313	2660	0014489		0029	14493													
		STD	0030	0044	3313	2660	0014469		0043	14492													
188		OBS	0035	0041	33130	2660				14491													



REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS INDEX	MARS SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10°	1°	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE		AMT
31	540	EV	4440 N	04919 W		149	49	04	12	018	1965	CKS 9302		0057	00	17	3	4		X4	4 8		0068
		WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
		COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	(mba)	DRY BULB	WET BULB														
						16	S03	980	039	039	1	04											
MESSAGE TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C					
		STD	0000	0091	3309	2654	0015025		0000	14508													
018		OBS	0000	0091	33092	2654				14508													
018		OBS	0008	0066	33117	2658				14498													
		STD	0010	0043	3313	2660	0014476		0015	14488													
018		OBS	0015	-0007	33173	2666				14467													
		STD	0020	-0007	3317	2666	0013906		0029	14468													
		STD	0030	-0008	3317	2666	0013908		0043	14469													
		STD	0050	-0009	3317	2666	0013912		0071	14472													
018		OBS	0050	-0009	33170	2666				14472													

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS INDEX	MARS SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10°	1°	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE		AMT
31	540	EV	4438 N	04905 W		149	49	04	12	048	1965	CKS 9303		0071	00	14	2	2		X4	4 8		0069
		WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
		COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	(mba)	DRY BULB	WET BULB														
						16	S08	963	050	050	0	03											
MESSAGE TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C					
		STD	0000	0030	3325	2670	0013498		0000	14482													
048		OBS	0000	0030	33250	2670				14482													
		STD	0010	0024	3325	2670	0013466		0013	14481													
		STD	0020	0017	3325	2671	0013438		0027	14480													
048		OBS	0020	0017	33249	2671				14480													
		STD	0030	0009	3327	2673	0013238		0040	14478													
		STD	0050	-0012	3335	2680	0012525		0066	14473													
048		OBS	0050	-0012	33350	2680				14473													

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS INDEX	MARS SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10°	1°	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE		AMT
31	540	EV	4435 N	04855 W		149	48	04	12	078	1965	CKS 9304		0603	05	14	4	2		X6	5 8		0070
		WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
		COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	(mba)	DRY BULB	WET BULB														
						15	S16	932	061	061	1	07											
MESSAGE TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C					
		STD	0000	-0034	3308	2660	0014480		0000	14451													
078		OBS	0000	-0034	33084	2660				14451													
		STD	0010	-0023	3311	2661	0014321		0014	14458													
		STD	0020	-0013	3317	2666	0013905		0029	14465													
		STD	0030	-0002	3327	2673	0013185		0042	14473													
078		OBS	0049	0018	33557	2695				14489													
		STD	0050	0025	3358	2697	0010948		0066	14493													
078		OBS	0058	0082	33737	2706				14522													
		STD	0075	0083	3375	2707	0009973		0092	14526													
		STD	0100	0087	3377	2709	0009846		0117	14532													
		STD	0125	0096	3381	2711	0009600		0141	14541													
		STD	0150	0109	3386	2715	0009306		0165	14551													
078		OBS	0193	0142	33978	2722				14575													
		STD	0200	0157	3402	2724	0008436		0209	14583													
		STD	0250	0244	3430	2740	0007032		0248	14633													
		STD	0300	0296	3449	2750	0006098		0281	14667													
078		OBS	T0315	0304	34524	2752				14673													
078		OBS	0370	0307	34597	2758				14685													
		STD	0400	0313	3464	2761	0005206		0337	14693													
		STD	0500	0357	3475	2765	0004909		0388	14730													
078		OBS	T0533	0379	34789	2766				14745													



REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

31	540	EV	4437 N	04836 W	149	48	04	12	139	1965	CKS	9305	2926	12	15	3	4		X4	4	8	0071
						WATER		WIND			BARO- METER		AIR TEMP. °C									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$ ?	$\Sigma \Delta \rho$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	CLD
		STD	0000	0197	3364	2690	0011574	0000	14563								
139		OBS	0000	0197	33636	2690			14563								
		STD	0010	0215	3373	2697	0010997	0011	14573								
		STD	0020	0244	3384	2703	0010390	0022	14589								
139		OBS	0022	0251	33862	2704			14593								
		STD	0030	0305	3398	2709	0009842	0032	14619								
139		OBS	0043	0354	34114	2715			14644								
		STD	0050	0343	3413	2717	0009063	0051	14641								
139		OBS	0065	0329	34183	2723			14638								
		STD	0075	0341	3426	2728	0008085	0072	14646								
		STD	0100	0369	3444	2739	0007016	0091	14664								
		STD	0125	0395	3459	2749	0006168	0108	14682								
139		OBS	0128	0398	34602	2749			14683								
		STD	0150	0420	3468	2753	0005774	0123	14697								
		STD	0200	0460	3482	2760	0005207	0150	14724								
139		OBS	T0234	0479	34894	2764			14739								
		STD	0250	0476	3490	2765	0004844	0175	14740								
		STD	0300	0468	3492	2767	0004661	0199	14745								
		STD	0400	0448	3494	2771	0004394	0244	14754								
139		OBS	0467	0434	34947	2773			14759								
		STD	0500	0424	3494	2774	0004196	0287	14760								
		STD	0600	0399	3494	2776	0004079	0329	14766								
139		OBS	T0641	0392	34931	2776			14770								
		STD	0700	0388	3493	2776	0004085	0369	14778								
		STD	0800	0381	3493	2777	0004096	0410	14792								
139		OBS	0821	0379	34927	2777			14794								
		STD	0900	0370	3492	2778	0004131	0452	14804								
		STD	1000	0361	3491	2778	0004171	0493	14817								
139		OBS	T1024	0360	34910	2778			14820								
		STD	1100	0357	3491	2778	0004222	0535	14832								
139		OBS	T1189	0356	34911	2778			14846								

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

31	540	EV	4429 N	04758 W	149	47	04	12	180	1965	CKS	9306	3292	11	64	0	5		X4	4	8	0072
						WATER		WIND			BARO- METER		AIR TEMP. °C									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$ ?	$\Sigma \Delta \rho$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	CLD
		STD	0000	0432	3404	2701	0010564	0000	14669								
180		OBS	0000	0432	34039	2701			14669								
		STD	0010	0431	3404	2701	0010556	0011	14670								
180		OBS	0014	0429	34045	2702			14670								
		STD	0020	0417	3405	2704	0010350	0021	14666								
		STD	0030	0399	3405	2705	0010181	0031	14660								
		STD	0050	0371	3406	2709	0009852	0051	14652								
180		OBS	0064	0358	34077	2712			14649								
		STD	0075	0351	3409	2713	0009457	0075	14648								
180		OBS	0078	0350	34097	2714			14648								
		STD	0100	0352	3415	2718	0009032	0099	14653								
		STD	0125	0354	3424	2725	0008393	0120	14659								
180		OBS	0129	0354	34251	2726			14660								
		STD	0150	0373	3434	2731	0007848	0141	14673								
180		OBS	T0176	0399	34459	2738			14690								
		STD	0200	0436	3459	2744	0006667	0177	14711								
180		OBS	0231	0468	34721	2751			14731								
		STD	0250	0468	3475	2754	0005875	0208	14735								
		STD	0300	0462	3481	2759	0005414	0237	14741								
180		OBS	T0339	0452	34847	2763			14744								
		STD	0400	0424	3487	2768	0004647	0287	14743								
180		OBS	0429	0412	34885	2770			14743								
		STD	0500	0397	3489	2772	0004297	0332	14748								
		STD	0600	0379	3489	2774	0004191	0374	14757								
		STD	0700	0365	3489	2776	0004124	0416	14768								
		STD	0800	0354	3490	2778	0004012	0456	14780								
		STD	0900	0346	3490	2778	0004004	0496	14793								
186		OBS	T0930	0344	34906	2779			14798								
		STD	1000	0341	3491	2780	0003953	0536	14808								
		STD	1100	0340	3492	2780	0003947	0576	14824								
186		OBS	T1128	0340	34924	2781			14829								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INCHES	MARSEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT			
31	540	EV	48128N	050590W	150	80	04	29	201	1965	CKS	9307	0192	02	29	4	2		X2	6	8	0073			
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB													
									30	S22	963	022	016	7	05										
MESSNGR TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-30°		Σ Δ ρ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>3</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	S CODE							
		STD	0000	-0102	3277	2637	0016648		0000	14415															
201		OBS	0000	-0102	32770	2637				14415															
		STD	0010	-0098	3280	2639	0016422		0017	14418															
		STD	0020	-0095	3283	2642	0016198		0033	14422															
		STD	0030	-0091	3285	2643	0016050		0049	14426															
		STD	0050	-0084	3287	2644	0015910		0081	14433															
201		OBS	0052	-0083	32871	2645				14433															
201		OBS	0061	-0084	32870	2644				14435															
		STD	0075	-0077	3300	2655	0014925		0119	14442															
		STD	0100	-0059	3320	2670	0013452		0155	14457															
		STD	0125	-0035	3336	2682	0012337		0187	14475															
201		OBS	0125	-0035	33358	2682				14475															
		STD	0150	-0004	3348	2690	0011545		0217	14495															
201		OBS	T0169	0023	33545	2694				14511															

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INCHES	MARSSEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR, 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT				
31	540	EV	48128N	050590W		150	80	04	30	067	1965	CKS	9308	0150	01	27	3	2		X1	3	3	0074			
						WATER		WIND		BARO- METER (mba)	AIR TEMP. °C		VIL CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
						COLOR	TRANS.	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
						CODE	(m)																			
										26	S13	976	006	000	7	05										
MESSNGR TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-30°		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>3</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	S CODE								
		STD	0000	-0083	3286	2643	0016048		0000	14425																
067		OBS	0000	-0083	32856	2643				14425																
		STD	0010	-0084	3286	2643	0016032		0016	14426																
		STD	0020	-0085	3286	2644	0016016		0032	14427																
		STD	0030	-0085	3286	2644	0016000		0048	14429																
		STD	0050	-0087	3286	2644	0015961		0080	14431																
067		OBS	0054	-0087	32862	2644				14432																
		STD	0075	-0113	3297	2653	0015034		0119	14425																
067		OBS	0079	-0118	33000	2656				14423																
		STD	0100	-0035	3333	2680	0012559		0153	14470																
067		OBS	0118	0008	33490	2691				14495																
		STD	0125	0018	3352	2693	0011357		0183	14501																
067		OBS	0138	0026	33541	2694				14507																

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INCHES	MARSSEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR, 1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT	
31	540	EV	48128N	050590W		150	80	04	30	173	1965	CKS	9309	0192	02	20	3	2		X2	6	8		0075
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB												
									26	S17	017	005	003	7	05									
MESSNGR TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-30°		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>3</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	S CODE						
		STD	0000	-0110	3275	2636	0016763		0000	14411														
173		OBS	0000	-0110	32752	2636				14411														
		STD	0010	-0109	3276	2637	0016674		0017	14413														
		STD	0020	-0108	3277	2637	0016586		0033	14415														
		STD	0030	-0108	3278	2638	0016505		0050	14417														
		STD	0050	-0106	3281	2640	0016329		0083	14422														
173		OBS	0060	-0105	32817	2641				14424														
		STD	0075	-0136	3293	2651	0015250		0122	14413														
173		OBS	0075	-0136	32933	2651				14413														
		STD	0100	-0094	3313	2666	0013857		0159	14440														
		STD	0125	-0051	3330	2678	0012711		0192	14466														
173		OBS	0135	-0034	33365	2682				14477														
		STD	0150	-0008	3345	2688	0011754		0222	14492														
173		OBS	T0170	0026	33555	2695				14513														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER								
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT									
31	540	EV	48128N	050590W		150	80	05	01	079	1965	CKS	9310	0247	02	23	3	2		X1	0	1	0076								
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS															
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB																				
									25	S10	058	003	000										7	06							
MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-x10 <sup>3</sup>		Σ Δ O DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	Σ CC C													
		STD	0000	-0085	3280	2639	0016501		0000	14423																					
079		OBS	0000	-0085	32796	2639				14423																					
		STD	0010	-0088	3280	2639	0016494		0016	14423																					
		STD	0020	-0091	3280	2639	0016478		0033	14423																					
		STD	0030	-0094	3279	2639	0016471		0049	14424																					
079		OBS	0041	-0097	32793	2639				14424																					
		STD	0050	-0112	3282	2641	0016202		0082	14419																					
079		OBS	0057	-0122	32843	2643				14416																					
		STD	0075	-0144	3296	2654	0015021		0121	14410																					
079		OBS	0082	-0146	33008	2657				14411																					
		STD	0100	-0091	3318	2670	0013485		0157	14442																					
		STD	0125	-0031	3336	2682	0012340		0189	14477																					
079		OBS	0143	0000	33459	2688				14495																					
		STD	0150	0003	3347	2689	0011656		0219	14498																					
		STD	0200	0025	3355	2694	0011183		0276	14517																					
079		OBS	T0205	0027	33554	2695				14519																					

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT	
31	540	EV	47570N	050515W		150	70	05	02	075	1965	CKS	9311	0133	01	24	2	2		X4	X	9	0077	
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB												
								31	S02	986	011	006	6	05										
MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-x10 <sup>3</sup>		Σ Δ O DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	Σ CC C						
		STD	0000	-0157	3284	2644	0015936		0000	14390														
075		OBS	0000	-0157	32844	2644				14390														
		STD	0010	-0078	3285	2643	0016105		0016	14429														
075		OBS	0010	-0078	32850	2643				14429														
		STD	0020	-0087	3285	2643	0016046		0032	14426														
		STD	0030	-0097	3286	2644	0015994		0048	14423														
		STD	0050	-0115	3286	2645	0015887		0080	14418														
		STD	0075	-0138	3287	2646	0015751		0120	14411														
075		OBS	0075	-0138	32867	2646				14411														
		STD	0100	-0030	3337	2683	0012246		0155	14473														
075		OBS	0100	-0030	33374	2683				14473														
		STD	0125	0007	3348	2690	0011636		0184	14496														
075		OBS	0125	0007	33476	2690				14496														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	47570N	050515W		150	70	05	02	202	1965	CKS	9312	0141	01	22	2	2		X1	2	2	0078
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB												
								22	S09	010	017	009	7	05									
MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-x10 <sup>3</sup>		Σ Δ O DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	Σ CC C					
		STD	0000	-0037	3284	2640	0016328		0000	14446													
202		OBS	0000	-0037	32841	2640				14446													
		STD	0010	-0079	3284	2642	0016163		0016	14428													
202		OBS	0010	-0079	32842	2642				14428													
		STD	0020	-0088	3285	2643	0016082		0032	14426													
		STD	0030	-0097	3285	2644	0016001		0048	14423													
		STD	0050	-0115	3287	2645	0015850		0080	14418													
202		OBS	0073	-0135	32879	2647				14413													
		STD	0075	-0122	3294	2651	0015236		0119	14420													
202		OBS	0098	-0020	33396	2684				14478													
		STD	0100	-0019	3340	2685	0012106		0153	14479													
		STD	0125	-0001	3344	2687	0011846		0183	14491													
202		OBS	0127	0000	33446	2687				14492													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	MARS SQUARE	STATION TIME (GMT)					YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
CTRY CODE	IO. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT					
31	540	EV	4844 N	04819 W	149	88	05	07	089	1965	002	9313	2195	12	34	5	4		X2	6	8	0079					
						WATER		WIND		AIR TEMP. °C		BARO- METER		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS											
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB	VIS. CODE														
									34	516	081	044	039	7	08												
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CODE										
089		STD	0000	0350	3452	2748	0006150	0000	14641																		
		OBS	0000	0350	34520	2748			14641																		
		STD	0010	0346	3452	2748	0006121	0006	14641																		
		STD	0020	0344	3452	2748	0006111	0012	14642																		
		STD	0030	0341	3452	2749	0006091	0018	14642																		
089		STD	0050	0338	3452	2749	0006087	0031	14644																		
		OBS	0065	0337	34519	2749			14646																		
		STD	0075	0341	3455	2751	0005901	0046	14650																		
		STD	0100	0349	3462	2756	0005470	0060	14658																		
		STD	0125	0356	3469	2761	0005032	0073	14666																		
089		STD	0150	0362	3474	2764	0004736	0085	14674																		
		OBS	0174	0367	34790	2767			14680																		
		STD	0200	0367	3480	2768	0004375	0108	14685																		
		STD	0250	0366	3481	2769	0004335	0130	14693																		
		STD	0300	0365	3482	2770	0004295	0151	14701																		
089		STD	0400	0363	3484	2772	0004216	0194	14717																		
		OBS	0404	0363	34842	2772			14717																		
		STD	0500	0365	3486	2773	0004180	0236	14734																		
		STD	0600	0367	3488	2774	0004161	0277	14752																		
		OBS	0610	0367	34878	2774			14754																		
089		STD	0700	0367	3489	2775	0004146	0319	14769																		
		STD	0800	0365	3489	2776	0004210	0361	14785																		
		OBS	0820	0364	34894	2776			14788																		
		STD	0900	0359	3489	2776	0004226	0403	14799																		
		STD	1000	0354	3489	2777	0004252	0445	14813																		
089		OBS	T1051	0352	34888	2777			14821																		
		STD	1100	0350	3489	2777	0004308	0488	14828																		
		STD	1200	0348	3489	2777	0004372	0532	14844																		
089		OBS	T1243	0347	34885	2777			14851																		

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	SHIP INDIC	MARS DEN SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.					TYPE	AMT	
																DIR.	HGT	PER	SEA				
31	540	EV	4839 N	04825 W		149	88	05	07	109	1965	002	9314	2085	13	01	4	3		X5	5	8	0080
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	DRY BULB	WET BULB												
								36	518	095	056	050	5					08					
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ σ OYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>3</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	S CODE					
		STD	0000	0344	3449	2746	0006299		0000	14638													
109		OBS	0000	0344	34493	2746				14638													
		STD	0010	0344	3450	2746	0006279		0006	14640													
		STD	0020	0343	3450	2747	0006267		0013	14641													
		STD	0030	0342	3450	2747	0006247		0019	14642													
		STD	0050	0341	3451	2747	0006208		0031	14645													
		STD	0075	0340	3451	2748	0006170		0047	14649													
		STD	0100	0339	3452	2749	0006125		0062	14653													
109		OBS	0110	0338	34523	2749				14654													
		STD	0125	0343	3457	2752	0005810		0077	14659													
		STD	0150	0350	3464	2757	0005371		0091	14667													
		STD	0200	0361	3476	2766	0004620		0116	14682													
109		OBS	0221	0365	34794	2768				14687													
		STD	0250	0365	3480	2768	0004402		0139	14692													
		STD	0300	0365	3482	2770	0004294		0160	14701													
		STD	0400	0364	3485	2773	0004152		0203	14717													
109		OBS	T0441	0364	34857	2773				14724													
		STD	0500	0364	3486	2773	0004163		0244	14734													
		STD	0600	0364	3487	2774	0004175		0286	14751													
109		OBS	T0662	0364	34879	2775				14761													
		STD	0700	0364	3488	2775	0004187		0328	14767													
		STD	0800	0364	3489	2776	0004199		0370	14784													
109		OBS	0883	0362	34900	2777				14797													
		STD	0900	0361	3490	2777	0004168		0411	14800													
		STD	1000	0356	3490	2778	0004171		0453	14814													
		STD	1100	0352	3491	2778	0004184		0495	14829													
109		OBS	T1125	0351	34908	2778				14833													
		STD	1200	0349	3490	2778	0004281		0537	14845													
		STD	1300	0348	3489	2777	0004422		0581	14861													
109		OBS	T1324	0348	34888	2777				14865													



REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER				
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT					
31	540	EV	4835 N	04831 W		149	88	05	07	127	1965	002	9315	1866	12	35	3	4		X2	5	8	0081				
						WATER		WIND		BARO- METER		AIR TEMP. °C		NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE			DRY BULB	WET BULB				VIS. CODE										
						36		S18	112			061	050				8	10									
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH										
127	STD	0000	0264	3423	2732	0007591	0000	14600																			
	OBS	0000	0264	34230	2732			14600																			
	STD	0010	0266	3427	2735	0007310	0007	14603																			
	STD	0020	0268	3430	2738	0007105	0015	14606																			
127	STD	0030	0270	3433	2740	0006901	0022	14609																			
	OBS	0041	0272	34347	2741			14612																			
	STD	0050	0262	3436	2743	0006622	0035	14609																			
	OBS	0052	0260	34362	2743			14609																			
127	OBS	0072	0305	34500	2750			14633																			
	STD	0075	0308	3451	2751	0005901	0051	14635																			
	STD	0100	0327	3459	2755	0005490	0065	14649																			
	STD	0125	0344	3466	2759	0005142	0078	14661																			
127	STD	0150	0359	3472	2763	0004857	0091	14672																			
	OBS	0181	0374	34783	2766			14685																			
	STD	0200	0373	3479	2767	0004539	0114	14687																			
	STD	0250	0371	3480	2768	0004486	0137	14695																			
127	STD	0300	0369	3481	2769	0004435	0159	14702																			
	STD	0400	0365	3483	2771	0004329	0203	14717																			
	OBS	T0414	0364	34830	2771			14719																			
	STD	0500	0367	3485	2772	0004291	0246	14735																			
127	STD	0600	0370	3487	2773	0004274	0289	14753																			
	OBS	T0621	0371	34870	2773			14757																			
	STD	0700	0371	3488	2774	0004287	0332	14770																			
	STD	0800	0369	3489	2775	0004285	0375	14786																			
127	OBS	0828	0368	34889	2775			14791																			
	STD	0900	0365	3489	2776	0004290	0417	14801																			
	STD	1000	0360	3489	2776	0004318	0461	14816																			
	OBS	T1056	0357	34891	2777			14824																			
127	STD	1100	0359	3489	2776	0004378	0504	14832																			
	STD	1200	0367	3489	2776	0004544	0549	14852																			
	OBS	T1242	0372	34895	2775			14862																			

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOCC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT				
31	540	EV	4829 N	04842 W		149	88	05	07	144	1965	002	9316	1646	12	36	3	3		X4	4	6	0082			
						WATER		WIND		BARO- METER (mba)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
						36 <td>S16</td> <td>122</td> <td>072</td> <td>056</td> <td>7</td> <td>11</td> <th colspan="10"></th>		S16	122		072	056					7	11								
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH									
144	STD	0000	0110	3359	2693	0011362	0000	14523																		
	OBS	0000	0110	33588	2693			14523																		
	STD	0010	0109	3360	2694	0011244	0011	14525																		
	STD	0020	0108	3362	2695	0011124	0022	14526																		
144	OBS	0021	0108	33619	2695			14526																		
	STD	0030	0095	3370	2703	0010423	0033	14523																		
144	OBS	0031	0094	33714	2704			14523																		
	STD	0050	0126	3390	2717	0009098	0053	14543																		
144	OBS	0057	0139	33963	2721			14551																		
	STD	0075	0182	3412	2730	0007823	0074	14575																		
	STD	0100	0236	3431	2741	0006813	0092	14605																		
	STD	0125	0281	3447	2750	0005998	0108	14631																		
144	OBS	0129	0287	34489	2751			14635																		
	STD	0150	0308	3456	2755	0005578	0123	14648																		
	STD	0200	0349	3470	2762	0004952	0149	14676																		
	STD	0250	0376	3479	2767	0004590	0173	14697																		
144	OBS	0259	0380	34807	2768			14700																		
	STD	0300	0379	3481	2768	0004513	0196	14706																		
	STD	0400	0376	3482	2769	0004503	0241	14722																		
	OBS	T0414	0375	34820	2769			14724																		
144	STD	0500	0373	3484	2771	0004412	0285	14738																		
	STD	0600	0371	3485	2772	0004405	0329	14754																		
	OBS	T0621	0371	34855	2772			14757																		
	STD	0700	0371	3487	2773	0004377	0373	14770																		
144	STD	0800	0371	3488	2774	0004375	0417	14787																		
	OBS	0828	0371	34880	2774			14792																		
	STD	0900	0366	3488	2775	0004366	0461	14802																		
	STD	1000	0360	3489	2776	0004359	0504	14816																		
144	OBS	T1056	0358	34886	2776			14824																		
	STD	1100	0356	3489	2776	0004387	0548	14831																		
	STD	1200	0354	3489	2777	0004430	0592	14847																		
	OBS	T1242	0353	34888	2777			14853																		



REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDIC	MARSOEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER									
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT								
31	540	EV	4821 N	04854 W		149	88	05	07	161	1965	002	9317		1097	09	36	5	3		X4	4	5		0083						
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																			
								35 <td>512</td> <td>125</td> <td>039</td> <td>028</td> <td>7</td> <td>08</td> <td colspan="16"></td>		512	125	039	028	7	08																
MESSAGE TIME OF HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?		Σ Δ ρ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C												
		STD	0000	0109	3346	2683		0012300		0000	14521																				
161		OBS	0000	0109	33464	2683					14521																				
		STD	0010	0098	3352	2688		0011808		0012	14519																				
161		OBS	0019	0090	33566	2692					14517																				
		STD	0020	0092	3357	2692		0011393		0024	14518																				
		STD	0030	0107	3365	2698		0010875		0035	14528																				
		STD	0050	0137	3381	2709		0009853		0056	14547																				
		STD	0075	0172	3398	2720		0008811		0079	14569																				
		STD	0100	0204	3414	2730		0007846		0100	14589																				
		STD	0125	0234	3428	2739		0007036		0118	14608																				
		STD	0150	0260	3440	2746		0006360		0135	14625																				
161		OBS	0195	0301	34576	2757					14653																				
		STD	0200	0304	3458	2757		0005427		0164	14655																				
		STD	0250	0333	3466	2760		0005137		0191	14677																				
		STD	0300	0356	3472	2763		0004955		0216	14696																				
161		OBS	T0341	0370	34760	2765					14709																				
		STD	0400	0370	3478	2767		0004721		0265	14719																				
		STD	0500	0370	3482	2770		0004525		0311	14736																				
161		OBS	0568	0370	34846	2772					14748																				
169		OBS	T0584	0370	34838	2771					14750																				
		STD	0600	0370	3484	2771		0004463		0356	14753																				
		STD	0700	0369	3486	2773		0004396		0400	14769																				
169		OBS	0782	0369	34871	2774					14783																				
		STD	0800	0371	3487	2774		0004404		0444	14787																				
		STD	0900	0384	3488	2773		0004569		0489	14809																				
169		OBS	T0905	0385	34884	2773					14810																				

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDIC	MARSOEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER	
CTRY CODE	ID. NO.						10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4814 N	04903 W		149	89	05	07	185	1965	002	9318	0320	03	34	5	3		X1	7	7	0084	
							WATER		WIND				AIR TEMP. °C											
							COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
											32	512	129	022	011	7	10							
MESSAGE TIME OF HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ ρ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C						
185		STD	0000	-0016	3303	2655	0014975		0000	14458														
		OBS	0000	-0016	33029	2655				14458														
		STD	0010	-0023	3303	2655	0014936		0015	14457														
		STD	0020	-0029	3304	2656	0014829		0030	14456														
185		OBS	0029	-0035	33054	2657				14455														
		STD	0030	-0042	3306	2658	0014620		0045	14452														
185		OBS	0040	-0100	33082	2662				14427														
		STD	0050	-0090	3309	2662	0014204		0073	14433														
185		OBS	0073	-0071	33275	2677				14448														
		STD	0075	-0070	3331	2679	0012581		0107	14450														
185		OBS	0083	-0064	33431	2689				14455														
185		OBS	0088	0080	33505	2688				14523														
185		OBS	0098	0062	33611	2697				14518														
185		STD	0100	0062	3363	2699	0010764		0136	14519														
		OBS	0107	0063	33698	2704				14521														
		STD	0125	0102	3384	2713	0009410		0161	14544														
		STD	0150	0152	3403	2725	0008311		0183	14573														
185		STD	0200	0239	3435	2744	0006587		0221	14624														
		OBS	0219	0267	34445	2749				14640														
		STD	0250	0307	3458	2757	0005490		0251	14665														
		STD	0300	0358	3474	2764	0004825		0277	14697														
185		OBS	T0316	0370	34778	2766				14705														

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DEPTH METER	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT			
31	540	EV	4807 N	04912 W	149	89	05	07	199	1965	002	9319	0230	02	33	5	3		X2	7	8		0085		
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB													
								32	S18	135	022	017	7	07											
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg · dl/l	TOTAL-P μg · dl/l	NO <sub>2</sub> -N μg · dl/l	NO <sub>3</sub> -N μg · dl/l	SiO <sub>4</sub> -Si μg · dl/l	pH							
		STD	0000	-0053	3286	2643		0016106		0000	14439														
199		OBS	0000	-0053	32862	2643					14439														
		STD	0010	-0064	3287	2643		0016031		0016	14435														
		STD	0020	-0075	3287	2644		0015949		0032	14432														
		STD	0030	-0086	3288	2645		0015875		0048	14429														
199		OBS	0045	-0101	32882	2646					14424														
		STD	0050	-0106	3289	2647		0015684		0080	14423														
		STD	0075	-0131	3296	2653		0015057		0118	14416														
199		OBS	0088	-0142	32996	2656					14414														
		STD	0100	-0151	3302	2659		0014524		0155	14412														
		STD	0125	-0170	3310	2666		0013844		0190	14408														
199		OBS	0135	-0177	33144	2669					14407														
		STD	0150	-0101	3323	2674		0013040		0224	14446														
199		OBS	0150	-0101	33230	2674					14446														
199		OBS	0170	0019	33480	2689					14509														
		STD	0200	0114	3375	2705		0010178		0282	14560														
199		OBS	T0225	0116	33887	2716					14567														

REFERENCE	SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DEPTH INDICATOR	MARDEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
						10"	1"	MO	DAY		HR./1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT			
						WATER COLOR CODE	WIND TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE		BARO- METER (mbs)													AIR TEMP. °C		VIS CODE
31	540	EV	4800 N	04925 W	149	89	05	07	213	1965	002	9320	0165	02	32	5	4		X2	4	8		0086			
						WATER COLOR CODE	WIND TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE	BARO- METER (mbs)	AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
											DRY BULB	WET BULB														
									33	S16	142	022	017	7	06											
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg · dl/l	TOTAL-P μg · dl/l	NO <sub>3</sub> -N μg · dl/l	NO <sub>3</sub> -N μg · dl/l	SiO <sub>4</sub> -Si μg · dl/l	pH	STATION NUMBER									
213		STD	0000	-0011	3282	2637	0016625	0000	14458																	
		OBS	0000	-0011	32816	2637			14458																	
		STD	0010	-0012	3282	2637	0016618	0017	14459																	
		STD	0020	-0013	3282	2637	0016602	0033	14460																	
213		OBS	0024	-0013	32817	2637			14461																	
		STD	0030	-0028	3283	2639	0016435	0050	14455																	
213		OBS	0048	-0075	32888	2646			14437																	
		STD	0050	-0082	3289	2646	0015763	0082	14434																	
213		OBS	0072	-0138	32978	2655			14413																	
		STD	0075	-0137	3299	2656	0014810	0120	14414																	
213		STD	0100	-0121	3309	2663	0014074	0156	14427																	
		OBS	0120	-0096	33205	2672			14443																	
		STD	0125	-0088	3324	2674	0013023	0190	14448																	
		STD	0150	-0038	3343	2688	0011766	0221	14478																	
213		OBS	T0161	-0011	33531	2695			14494																	

REFERENCE	SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	SHIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
					10"	1"	MO	DAY	HR./1/10	CRUISE NO.		STATION NUMBER	DIR.			HGT	PER	SEA	TYPE		AMT		
31	540	EV	4752 N	04936 W		149	79	05	07	226	1965	002	9321	0163	02	33	3	5		X7	5	8	0087
					WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS						
					COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)		DRY BULB	WET BULB	7		04								
							32	S22	152	017	011	7	04										
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$ ?		$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g \cdot dl/l$	TOTAL-P $\mu g \cdot dl/l$	NO <sub>3</sub> -N $\mu g \cdot dl/l$	NO <sub>3</sub> -N $\mu g \cdot dl/l$	SiO <sub>4</sub> -Si $\mu g \cdot dl/l$	pH						
		STD	0000	-0080	3282	2640	0016341		0000	14426													
226		OBS	0000	-0080	32819	2640				14426													
		STD	0010	-0077	3282	2640	0016339		0016	14429													
		STD	0020	-0074	3282	2640	0016329		0033	14432													
		STD	0030	-0070	3282	2640	0016327		0049	14435													
226		OBS	0031	-0070	32823	2640				14435													
		STD	0050	-0090	3284	2642	0016120		0081	14430													
		STD	0075	-0115	3292	2650	0015410		0121	14423													
		STD	0100	-0141	3305	2661	0014322		0158	14417													
226		OBS	0104	-0145	33072	2663				14416													
		STD	0125	-0097	3323	2674	0013068		0192	14444													
		STD	0150	0001	3348	2690	0011570		0223	14497													
226		OBS	T0155	0026	33533	2693				14510													

REFERENCE	SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT					
31	540	EV	4738 N	04857 W	149	78	05	08	017	1965	002	9322	0152	01	34	6	4		X7	5	8		0088			
					WATER		WIND		BARO- METER		AIR TEMP. °C		VIS.		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS									
					COLOR CODE		TRANS. (m)		DIR.		SPEED OF FORCE		DRY BULB		WET BULB		VIS. CODE									
							32		S18		146		006		000		7		05							
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta$ D DYN. M. x 10 <sup>3</sup>		SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P µg · at/l	TOTAL-P µg · at/l	NO <sub>2</sub> -N µg · at/l	NO <sub>3</sub> -N µg · at/l	SiO <sub>4</sub> -Si µg · at/l	pH	S CC					
		STD	0000	-0074	3284	2641		0016239		0000		14429														
017		OBS	0000	-0074	32835	2641						14429														
		STD	0010	-0078	3284	2642		0016197		0016		14428														
		STD	0020	-0084	3284	2642		0016156		0032		14427														
		STD	0030	-0092	3284	2643		0016101		0049		14425														
		STD	0050	-0112	3285	2644		0015988		0081		14419														
017		OBS	0052	-0114	32849	2644						14419														
017		OBS	0072	-0141	32977	2655						14411														
		STD	0075	-0135	3302	2658		0014585		0119		14415														
		STD	0100	-0084	3330	2679		0012592		0153		14447														
		STD	0125	-0026	3350	2693		0011295		0183		14481														
017		OBS	0128	-0018	33512	2694						14485														
017		OBS	T0149	0038	33590	2697						14515														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
CTRY CODE	ID. NO.					10"	1'	MO	DAY		HR,1/10	CRUISE NO.			STATION NUMBER	OBSERVATIONS				TYPE	AMT						
																DIR.	HGT	PER					SEA				
31	540	EV	4745 N	04845 W		149	78	05	08	032	1965	002	9323		0186	02	33	3	3		X2	5	8		0089		
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB															
									33	S14	142		022	017	7	05											
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CC									
		STD	0000	-0054	3288	2644	0015980		0000	14439																	
032		OBS	0000	-0054	32878	2644				14439																	
		STD	0010	-0056	3288	2644	0015976		0016	14439																	
		STD	0020	-0058	3288	2644	0015979		0032	14440																	
032		OBS	0026	-0059	32874	2644				14440																	
		STD	0030	-0072	3288	2645	0015885		0048	14435																	
		STD	0050	-0123	3293	2651	0015327		0079	14415																	
		STD	0075	-0153	3302	2659	0014537		0116	14407																	
032		OBS	0088	-0154	33077	2663				14409																	
		STD	0100	-0100	3321	2672	0013224		0151	14438																	
		STD	0125	-0015	3343	2687	0011879		0183	14485																	
		STD	0150	0036	3356	2695	0011145		0211	14514																	
032		OBS	0166	0050	33604	2698				14524																	
032		OBS	T0181	0050	33610	2698				14526																	

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARDEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10'	1"	MO	DAY	HR./10	CRUISE NO.		STATION NUMBER	DIR.			HGT	PER	SEA	TYPE		AMT		
31	540	EV	4750 N	04833 W		149	78	05	08	045	1965	002	9324	0221	02	35	3	3		X4	7	3	0090	
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS						
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	(mbs)	DRY BULB	WET BULB												
									34	S18	142	011	011	7	07									
MESSAGE TIME HR 1/10		CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta$ D DYN. M. $\times 10^3$		SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{at/l}$	pH	S CC		
			STD	0000	-0079	3286	2643		0016030		0000		14427											
045			OBS	0000	-0079	32860	2643						14427											
			STD	0010	-0082	3286	2644		0015992		0016		14427											
			STD	0020	-0086	3287	2644		0015950		0032		14427											
			STD	0030	-0091	3287	2645		0015905		0048		14426											
045			OBS	0030	-0091	32869	2645						14426											
			STD	0050	-0106	3290	2648		0015615		0079		14423											
			STD	0075	-0125	3294	2651		0015266		0118		14419											
045			OBS	0091	-0137	32959	2653						14416											
			STD	0100	-0128	3300	2656		0014742		0156		14422											
			STD	0125	-0103	3314	2667		0013735		0191		14440											
045			OBS	0132	-0096	33194	2671						14445											
			STD	0150	-0015	3337	2682		0012330		0224		14488											
045			OBS	T0168	0034	33508	2691						14515											
045			OBS	0193	0047	33655	2702						14528											
			STD	0200	0066	3373	2707		0010024		0280		14538											
045			OBS	T0218	0144	33973	2721						14580											

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4759 N	04821 W		149	78	05	08	058	1965	002	9325	0282	03	35	4	3		X4	4	3	0091
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbars)	DRY BULB	WET BULB											
								35	S10	146	072	067	7	06									
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-30°	Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>2</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH	S C						
		STD	0000	-0052	3284	2641	0016278	0000	14439														
058		OBS	0000	-0052	32840	2641			14439														
		STD	0010	-0055	3284	2641	0016240	0016	14439														
		STD	0020	-0058	3285	2642	0016202	0032	14440														
058		OBS	0025	-0059	32847	2642			14440														
		STD	0030	-0078	3286	2643	0016017	0049	14432														
		STD	0050	-0134	3292	2650	0015373	0080	14410														
058		OBS	0051	-0136	32923	2650			14409														
		STD	0075	-0143	3301	2658	0014640	0117	14411														
058		OBS	0091	-0148	33086	2664			14412														
		STD	0100	-0112	3320	2672	0013260	0152	14432														
		STD	0125	-0022	3348	2691	0011466	0183	14482														
		STD	0150	0054	3371	2706	0010107	0210	14524														
		STD	0200	0161	3405	2726	0008238	0256	14585														
058		OBS	T0223	0191	34154	2732			14604														
		STD	0250	0210	3422	2736	0007351	0295	14618														
058		OBS	T0274	0213	34243	2738			14623														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT NODC	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT				
31	540	EV	4805 N	04812 W		149	88	05	08	075	1965	002	9326	0413	04	35	4	4		X1	7	6	0092			
						WATER		WIND		BARO- METER lbs/sq	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
								35	S13		149	022					017	7	07							
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %.	SIGMA-T		SPECIFIC VOLUME ANOMALY-30°		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>2</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	PH								
075		STD	0000	-0031	3287	2643		0016122		0000	14449															
		OBS	0000	-0031	32871	2643					14449															
075		STD	0010	-0032	3287	2643		0016114		0016	14450															
		OBS	0010	-0032	32871	2643					14450															
075		STD	0020	-0113	3292	2649		0015452		0032	14415															
		OBS	0026	-0142	32947	2652					14403															
075		STD	0030	-0148	3297	2654		0014967		0047	14401															
		OBS	0036	-0156	33000	2657					14398															
		STD	0050	-0106	3318	2670		0013462		0076	14427															
		STD	0075	-0024	3347	2690		0011547		0107	14473															
		STD	0100	0051	3373	2708		0009940		0134	14515															
		STD	0125	0117	3396	2722		0008597		0157	14552															
		STD	0150	0175	3416	2734		0007495		0177	14585															
	075	OBS	T0166	0208	34271	2740					14604															
075		STD	0200	0265	3445	2750		0006056		0211	14636															
		OBS	0233	0310	34594	2757					14663															
		STD	0250	0329	3465	2760		0005174		0239	14675															
		STD	0300	0368	3478	2767		0004627		0263	14702															
		STD	0400	0372	3478	2766		0004735		0310	14720															
	075	OBS	T0400	0372	34783	2766					14720															



REFERENCE		SHIP CODE	LATITUDE °    '    '' 1/10	LONGITUDE °    '    '' 1/10	DRIFT DIRECTION	MARS SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- TER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1'	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYP		AMT
31	540	EV	4817 N	04745 W		149	87	05	08	113	1965	002	9328	1573	12	01	6	2		X1	4	2	0094
						WATER		WIND		BARO- METER (mb)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB												
								34	S10	156	039	033	8	10									
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> °	S Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ol/l	TOTAL-P μg - ol/l	NO <sub>2</sub> -N μg - ol/l	NO <sub>3</sub> -N μg - ol/l	Si O <sub>4</sub> -Si μg - ol/l	pH	S C C						
		STD	0000	0216	3401	2719	0008879	0000	14576														
113		OBS	0000	0216	34010	2719			14576														
		STD	0010	0217	3403	2720	0008777	0009	14578														
113		OBS	0010	0217	34025	2720			14578														
		STD	0020	0232	3415	2729	0007949	0017	14588														
		STD	0030	0247	3426	2736	0007239	0025	14598														
		STD	0050	0276	3438	2743	0006588	0039	14616														
113		OBS	0062	0294	34396	2743			14626														
		STD	0075	0247	3437	2745	0006436	0055	14607														
113		OBS	0078	0238	34361	2745			14603														
		STD	0100	0265	3444	2749	0006071	0071	14620														
		STD	0125	0292	3452	2753	0005718	0085	14637														
		STD	0150	0316	3460	2757	0005351	0099	14652														
		STD	0200	0354	3472	2763	0004851	0125	14678														
113		OBS	0207	0358	34730	2764			14681														
		STD	0250	0360	3476	2766	0004654	0148	14690														
		STD	0300	0363	3478	2767	0004571	0171	14699														
		STD	0400	0367	3482	2770	0004409	0216	14718														
113		OBS	T0414	0368	34825	2770			14721														
		STD	0500	0365	3483	2771	0004398	0260	14734														
		STD	0600	0362	3484	2772	0004374	0304	14749														
113		OBS	T0621	0361	34846	2773			14753														
		STD	0700	0364	3486	2773	0004332	0348	14767														
		STD	0800	0367	3487	2774	0004382	0391	14785														
113		OBS	0828	0368	34872	2774			14790														
		STD	0900	0366	3488	2775	0004374	0435	14802														
		STD	1000	0363	3489	2776	0004342	0479	14817														
113		OBS	T1056	0361	34899	2777			14826														
		STD	1100	0359	3490	2777	0004349	0522	14832														
		STD	1200	0354	3489	2777	0004415	0566	14847														
113		OBS	T1242	0351	34887	2777			14853														



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INCHES	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT							
31	540	EV	4827 N	04723 W		149	87	05	08	141	1965	002	9329	2158	12	01	5	2		X1	8	7	0095						
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS															
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	BARO-METER (mbars)	DRY BULB	WET BULB	VIS. CODE																
									34	S12	163	039	033	8	09														
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-2107		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH												
141		STD	0000	0330	3435	2736	0007265		0000	14630																			
		OBS	0000	0330	34348	2736				14630																			
		STD	0010	0328	3436	2737	0007162		0007	14631																			
		STD	0020	0326	3437	2738	0007074		0014	14632																			
		STD	0030	0323	3439	2740	0006910		0021	14633																			
141		STD	0050	0319	3444	2744	0006508		0035	14635																			
		STD	0075	0313	3453	2752	0005798		0050	14638																			
		OBS	0081	0312	34552	2754				14639																			
		STD	0100	0355	3465	2758	0005302		0064	14661																			
		OBS	0104	0363	34668	2758				14666																			
141		STD	0125	0364	3469	2760	0005112		0077	14670																			
		STD	0150	0366	3472	2762	0004922		0090	14675																			
		STD	0200	0369	3477	2766	0004619		0113	14685																			
		STD	0250	0371	3480	2768	0004468		0136	14695																			
		OBS	0261	0372	34807	2768				14697																			
141		STD	0300	0373	3482	2769	0004379		0158	14704																			
		OBS	T0380	0375	34835	2770				14718																			
		STD	0400	0375	3484	2771	0004342		0202	14722																			
		STD	0500	0376	3486	2772	0004294		0245	14739																			
		OBS	T0575	0377	34871	2773				14752																			
141		STD	0600	0376	3487	2773	0004292		0288	14756																			
		STD	0700	0371	3488	2774	0004280		0331	14770																			
		OBS	0771	0368	34882	2775				14781																			
		STD	0800	0367	3488	2775	0004285		0374	14785																			
		STD	0900	0363	3489	2776	0004287		0417	14800																			
141		OBS	T0988	0360	34892	2776				14814																			
		STD	1000	0360	3489	2776	0004307		0459	14816																			
		STD	1100	0356	3489	2777	0004335		0503	14831																			
		OBS	T1163	0353	34894	2777				14840																			

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INCHES	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4818 N	04649 W		149	86	05	08	167	1965	002	9330	1372	12	85	0	4		X1	2	2	0096
						WATER		WIND		BARO- METER (mba)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB											
									34	S12	159	044	033	7	11								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-10 <sup>3</sup>	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	3 C.C.						
		STD	0000	0250	3396	2712	0009490	0000	14590														
167		OBS	0000	0250	33964	2712			14590														
		STD	0010	0237	3397	2714	0009387	0009	14586														
		STD	0020	0224	3397	2715	0009284	0019	14582														
167		OBS	0021	0223	33966	2715			14582														
		STD	0030	0252	3414	2726	0008190	0028	14599														
167		OBS	0031	0255	34161	2728			14600														
		STD	0050	0252	3424	2734	0007446	0043	14603														
		STD	0075	0248	3436	2744	0006522	0061	14607														
167		OBS	0077	0248	34367	2745			14608														
		STD	0100	0293	3451	2752	0005786	0076	14633														
167		OBS	0122	0330	34634	2759			14654														
		STD	0125	0331	3464	2759	0005169	0090	14655														
		STD	0150	0338	3468	2762	0004955	0102	14663														
		STD	0200	0352	3475	2766	0004608	0126	14678														
		STD	0250	0366	3480	2768	0004417	0149	14693														
		STD	0300	0381	3483	2769	0004383	0171	14708														
167		OBS	0305	0382	34831	2769			14709														
		STD	0400	0366	3484	2771	0004261	0214	14718														
167		OBS	T0407	0365	34838	2771			14719														
		STD	0500	0371	3486	2773	0004232	0256	14737														
		STD	0600	0377	3488	2774	0004238	0299	14756														
167		OBS	T0609	0377	34884	2774			14758														
		STD	0700	0372	3489	2775	0004202	0341	14771														
		STD	0800	0367	3490	2776	0004159	0383	14786														
167		OBS	0810	0366	34902	2776			14787														
		STD	0900	0360	3490	2777	0004149	0424	14799														
		STD	1000	0355	3490	2778	0004175	0466	14814														
167		OBS	T1034	0354	34902	2778			14819														
		STD	1100	0352	3490	2778	0004214	0508	14829														
		STD	1200	0349	3490	2778	0004251	0550	14845														
167		OBS	T1217	0349	34904	2778			14848														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS SQUARE	STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"		MO	DAY			HR.1/10	CRUISE NO.	STATION NUMBER		DIP	HGT		PER	SEA
31	540	EV	4810 N	04626 W	149	86	05 08	190	1965	002	9331	1317	11	35	6	3		X1	2	3	0097
						WATER		WIND		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mbs)	DRY BULB										WET BULB
								34	S13	159	044	038	8	10							
MESSAGE TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-x10 <sup>3</sup>		Σ Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C C		
		STD	0000	0270	3404	2717		0009076		0000	14600										
190		OBS	0000	0270	34040	2717					14600										
		STD	0010	0239	3405	2720		0008772		0009	14588										
		STD	0020	0217	3406	2722		0008555		0018	14580										
		STD	0030	0203	3406	2724		0008393		0026	14576										
190		OBS	0047	0201	34076	2725					14578										
		STD	0050	0204	3410	2727		0008128		0043	14580										
190		OBS	00580	0213	34151	2730					14586										
		STD	0075	0245	3429	2739		0007024		0062	14605										
		STD	0100	0286	3447	2750		0006026		0078	14629										
		STD	0125	0319	3462	2759		0005209		0092	14650										
190		OBS	0129	0324	34641	2760					14653										
		STD	0150	0333	3467	2761		0004983		0105	14660										
		STD	0200	0352	3473	2764		0004756		0129	14678										
		STD	0250	0366	3478	2767		0004563		0152	14692										
190		OBS	0276	0371	34798	2768					14699										
		STD	0300	0373	3481	2768		0004454		0175	14704										
190		OBS	T0367	0378	34846	2771					14718										
		STD	0400	0378	3486	2772		0004223		0218	14723										
		STD	0500	0376	3488	2774		0004142		0260	14739										
190		OBS	T0549	0375	34892	2775					14747										
		STD	0600	0373	3489	2775		0004102		0301	14755										
		STD	0700	0369	3489	2776		0004139		0342	14770										
190		OBS	0731	0368	34894	2776					14774										
		STD	0800	0367	3490	2776		0004196		0384	14786										
		STD	0900	0363	3490	2776		0004221		0426	14801										
190		OBS	T0935	0361	34898	2777					14806										
		STD	1000	0356	3490	2777		0004201		0468	14814										
		STD	1100	0347	3490	2778		0004177		0510	14827										
190		OBS	T1102	0347	34901	2778					14828										

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	WAVE INDIC	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE		AMT	
31	540	EV	4759 N	04600 W		149	76	05	08	216	1965	002	9332	0914	08	33	3	2		X6	3	8		0098
						WATER		WIND		BARO- METER (mbs)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB													
								32		S20	159	044	039	7	07									
MESSAGE TIME HR 1/10	CAS T NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY-x10 <sup>3</sup>		Σ Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C C						
		STD	0000	0381	3426	2724	0008423		0000	14651														
216		OBS	0000	0381	34257	2724				14651														
		STD	0010	0380	3425	2723	0008453		0008	14652														
216		OBS	0011	0380	34253	2723				14652														
216		OBS	0019	0379	34254	2724				14653														
		STD	0020	0379	3426	2724	0008399		0017	14653														
		STD	0030	0380	3431	2728	0008043		0025	14656														
		STD	0050	0383	3441	2736	0007330		0040	14662														
		STD	0075	0386	3452	2744	0006554		0058	14668														
		STD	0100	0388	3462	2752	0005854		0073	14675														
		STD	0125	0391	3470	2758	0005305		0087	14681														
		STD	0150	0394	3478	2764	0004756		0100	14688														
216		OBS	0166	0396	34818	2767				14692														
		STD	0200	0391	3483	2768	0004397		0123	14695														
		STD	0250	0384	3485	2771	0004222		0144	14701														
		STD	0300	0378	3486	2772	0004131		0165	14707														
216		OBS	T0383	0370	34878	2774				14717														
		STD	0400	0370	3488	2774	0003989		0206	14720														
		STD	0500	0366	3488	2775	0004035		0246	14735														
216		OBS	0583	0362	34886	2776				14747														
		STD	0600	0361	3489	2776	0003994		0286	14750														
		STD	0700	0355	3489	2777	0004013		0326	14764														
216		OBS	0773	0349	34891	2777				14773														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE MO/DA/HR	MARSDEN SQUARE		STATION TIME (GMT)	YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE		CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"			CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA			TYPE	AMT	
31	540	EV	4740 N	04600 W	149	76	05	09 004	1965	002	9333	0570	06	30	5	2		X2	8	8		0099

WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		34	512	152	039	028	8	06	

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ ρ DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C
		STD	0000	0344	3429	2730	0007844	0000	14635								
	004	OBS	0000	0344	34288	2730			14635								
		STD	0010	0339	3429	2730	0007789	0008	14635								
		STD	0020	0334	3429	2731	0007734	0016	14634								
		STD	0030	0328	3429	2732	0007680	0023	14634								
		STD	0050	0318	3430	2733	0007571	0039	14633								
	004	OBS	0052	0317	34298	2733			14632								
		STD	0075	0332	3442	2741	0006797	0056	14644								
	004	OBS	0098	0346	34535	2749			14656								
		STD	0100	0346	3454	2750	0006046	0073	14656								
		STD	0125	0350	3460	2754	0005655	0087	14663								
		STD	0150	0355	3465	2758	0005340	0101	14669								
		STD	0200	0363	3475	2765	0004713	0126	14682								
		STD	0250	0371	3482	2769	0004314	0149	14695								
		STD	0300	0379	3486	2772	0004144	0170	14707								
	004	OBS	T0323	0383	34879	2773			14713								
		STD	0400	0371	3489	2775	0003925	0210	14721								
	004	OBS	T0414	0370	34894	2775			14723								
		STD	0500	0368	3489	2776	0003949	0249	14736								
	004	OBS	T0560	0366	34893	2776			14745								

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE MO/DA/HR	MARSDEN SQUARE		STATION TIME (GMT)	YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE		CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"			CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA			TYPE	AMT	
31	540	EV	4738 N	04615 W	149	76	05	09 021	1965	002	9334	0410	04	32	5	2		X2	8	8		0100

WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		02	511	146	044	033	8	06	

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ ρ DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C
		STD	0000	0377	3435	2732	0007654	0000	14650								
	021	OBS	0000	0377	34354	2732			14650								
		STD	0010	0378	3439	2735	0007398	0008	14653								
		STD	0020	0378	3443	2738	0007110	0015	14655								
		STD	0030	0379	3446	2740	0006899	0022	14657								
		STD	0050	0380	3451	2744	0006551	0035	14662								
		STD	0075	0381	3455	2747	0006287	0051	14667								
	021	OBS	0088	0382	34563	2748			14670								
		STD	0100	0368	3456	2749	0006104	0067	14666								
	021	OBS	0122	0349	34557	2751			14661								
		STD	0125	0352	3457	2751	0005895	0082	14663								
		STD	0150	0369	3465	2756	0005481	0096	14675								
		STD	0200	0387	3477	2764	0004806	0122	14693								
	021	OBS	T0222	0388	34801	2766			14697								
		STD	0250	0378	3481	2768	0004460	0145	14698								
	021	OBS	T0273	0372	34819	2769			14699								
		STD	0300	0373	3483	2770	0004299	0167	14704								
	021	OBS	T0387	0374	34859	2772			14720								

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRAFT INCHES	MARS DEN SQUARE		STA - 1'		TIME		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER																													
CTRY CODE	IO. NO.					10"	1'	MO	DA	HR, 1/10	CRUISE NO.		STATION NUMBER	DIR.			HGT	PER	SEA	TYPE		AMT																															
31	540	EV	4733 N	04645 W	149	76	05	09	079	1965	002	9336	1161	11	31	3	3			X2	6	8	0102																														
<table><tr><th colspan="4">WATER</th><th colspan="2">WIND</th><th rowspan="2">BARO- METER (mb)</th><th colspan="2">AIR TEMP. °C</th><th rowspan="2">VIS. CODE</th><th rowspan="2">NO. OBS. DEPTHS</th><th rowspan="2">SPECIAL OBSERVATIONS</th></tr><tr><th>COLOR CODE</th><th>TRANS. (m)</th><th>DIR.</th><th>SPEED OR FORCE</th><th>DRY BULB</th><th>WET BULB</th></tr><tr><td></td><td></td><td>31</td><td>517</td><td>149</td><td>033</td><td>022</td><td>8</td><td>12</td><td></td><td></td><td></td></tr></table>																								WATER				WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB			31	517	149	033	022	8	12			
WATER				WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																										
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB																																																
		31	517	149	033	022	8	12																																													
MESSANGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Delta \sigma$ CYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CODE																																				
079		STD	0000	0194	3376	2701	0010612	0000	14563																																												
		OBS	0000	0194	33760	2701			14563																																												
		STD	0010	0191	3379	2703	0010371	0010	14564																																												
		STD	0020	0187	3382	2706	0010137	0021	14564																																												
079		OBS	0029	0184	33843	2708			14565																																												
		STD	0030	0185	3385	2708	0009876	0031	14565																																												
079		OBS	0048	0204	34062	2724			14579																																												
		STD	0050	0224	3411	2726	0008205	0049	14589																																												
079		OBS	0070	0319	34379	2739			14637																																												
		STD	0075	0303	3437	2740	0006912	0068	14631																																												
079		OBS	0083	0281	34363	2742			14623																																												
		STD	0100	0253	3437	2745	0006499	0084	14614																																												
079		OBS	0102	0252	34378	2745			14614																																												
		STD	0125	0295	3456	2756	0005444	0099	14639																																												
079		OBS	0148	0332	34712	2765			14660																																												
		STD	0150	0333	3471	2765	0004660	0112	14661																																												
		STD	0200	0346	3474	2765	0004630	0135	14675																																												
		STD	0250	0358	3476	2766	0004603	0158	14689																																												
079		STD	0300	0367	3479	2767	0004542	0181	14701																																												
		OBS	T0373	0376	34827	2770			14718																																												
		STD	0400	0376	3483	2770	0004426	0226	14722																																												
079		STD	0500	0376	3486	2772	0004291	0270	14739																																												
		OBS	T0559	0376	34868	2773			14749																																												
		STD	0600	0375	3487	2773	0004295	0313	14755																																												
079		STD	0700	0371	3488	2774	0004265	0355	14770																																												
		OBS	0758	0368	34886	2775			14779																																												
		STD	0800	0365	3489	2776	0004210	0398	14785																																												
079		STD	0900	0359	3489	2776	0004226	0440	14799																																												
		OBS	T0977	0356	34891	2777			14810																																												
		STD	1000	0355	3489	2777	0004248	0482	14814																																												
079		OBS	T1065	0354	34893	2777			14824																																												



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DATE INDIC	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT				
31	540	EV	4734 N	04659 W		149	76	05	09	094	1965	002	9337	1097	09	32	3	3		X1	6	6	0103				
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB															
										31	S08	159	017	011	8	08											
MESSENGER TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %.	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}^t$		$\Sigma \Delta \rho$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S CODE									
094		STD	0000	0139	3357	2689	0011711		0000	14536																	
		OBS	0000	0139	33566	2689				14536																	
		STD	0010	0138	3360	2692	0011446		0012	14537																	
		STD	0020	0136	3364	2695	0011135		0023	14539																	
094		STD	0030	0135	3368	2698	0010825		0034	14541																	
		OBS	0039	0134	33719	2702				14542																	
		STD	0050	0152	3380	2707	0010030		0055	14553																	
		STD	0075	0190	3398	2718	0008942		0078	14577																	
		STD	0100	0225	3415	2729	0007933		0100	14598																	
		STD	0125	0256	3429	2738	0007142		0118	14618																	
		STD	0150	0284	3442	2746	0006417		0135	14636																	
		STD	0200	0329	3463	2758	0005293		0165	14666																	
094		OBS	0200	0329	34629	2758				14666																	
		STD	0250	0346	3469	2762	0005039		0190	14683																	
		STD	0300	0360	3474	2764	0004846		0215	14698																	
		OBS	T0378	0376	34799	2767				14718																	
		STD	0400	0378	3481	2768	0004596		0262	14723																	
		STD	0500	0383	3485	2771	0004442		0308	14742																	
	094	OBS	0561	0384	34864	2772				14753																	
		STD	0600	0382	3487	2772	0004373		0352	14758																	
		STD	0700	0378	3488	2774	0004344		0395	14773																	
	094	OBS	0731	0376	34881	2774				14778																	
		STD	0800	0372	3489	2775	0004319		0438	14788																	
	094	OBS	T0852	0369	34889	2775				14795																	
094	OBS	0860	0362	34887	2776				14793																		

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDIC	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE
31	540	EV	4729 N	04715 W	149	77	05	09	113	1965	002	9338	0649	05	31	3	3		X7	6	6	0104
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS								
						COLOR	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mbs)	DRY BULB	WET BULB	VIS. CODE									
								31	S10	161	039	022	7	07								
MESSENGR TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> <sup>o</sup>	Σ Δ ρ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CODE					
113		STD	0000	0062	3345	2685	0012123	0000	14500													
		OBS	0000	0062	33452	2685			14500													
		STD	0010	0057	3345	2685	0012118	0012	14499													
113		OBS	0018	0053	33447	2685			14499													
		STD	0020	0058	3346	2686	0012039	0024	14501													
		STD	0030	0079	3351	2688	0011774	0036	14513													
113		OBS	0044	0108	33590	2693			14530													
		STD	0050	0114	3363	2696	0011072	0059	14534													
		STD	0075	0141	3381	2708	0009885	0085	14553													
		STD	0100	0167	3397	2719	0008858	0109	14570													
		STD	0125	0194	3412	2729	0007931	0130	14589													
		STD	0150	0221	3425	2738	0007169	0148	14606													
113		OBS	0185	0258	34409	2747			14630													
		STD	0200	0278	3447	2750	0006019	0181	14642													
		STD	0250	0331	3463	2758	0005343	0210	14676													
113		OBS	T0261	0340	34659	2760			14682													
		STD	0300	0355	3470	2762	0005095	0236	14695													
113		OBS	0353	0370	34755	2764			14711													
		STD	0400	0372	3479	2767	0004677	0285	14720													
		STD	0500	0375	3484	2771	0004427	0330	14738													
113		OBS	T0540	0376	34847	2771			14746													

REFERENCE		SHIP CODE	LATITUDE ° ' / 10	LONGITUDE ° ' / 10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER								
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT							
31	540	EV	4726 N	04726 W	149	77	05	09	129	1965	002	9339		0293	03	30	3	2		X2	7	8	0105							
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS														
						COLOR CODE	TRANS. INT	DIR.	SPEED OR FORCE	IMBS	DRY BULB	WET BULB																		
									30	516	169	044	028	8	08															
MESSNGR TIME of HR 1/10	CAS- T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>θ</sub>	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	S C													
		STD	0000	-0014	3295	2648	0015587	0000	14458																					
129		OBS	0000	-0014	32950	2648			14458																					
		STD	0010	-0015	3295	2648	0015565	0016	14459																					
		STD	0020	-0016	3295	2649	0015542	0031	14461																					
		STD	0030	-0017	3296	2649	0015511	0047	14462																					
129		OBS	0032	-0017	32957	2649			14462																					
		STD	0050	-0027	3304	2656	0014827	0077	14462																					
129		OBS	0063	-0034	33108	2662			14461																					
129		OBS	0072	-0110	33165	2669			14428																					
		STD	0075	-0089	3320	2671	0013352	0112	14439																					
129		OBS	0088	-0011	33338	2679			14479																					
		STD	0100	-0002	3339	2683	0012253	0144	14486																					
		STD	0125	0023	3352	2692	0011383	0174	14504																					
		STD	0150	0055	3366	2702	0010492	0201	14524																					
129		OBS	0151	0056	33664	2702			14525																					
		STD	0200	0203	3419	2734	0007501	0246	14606																					
		STD	0250	0274	3446	2750	0006090	0280	14649																					
129		OBS	T0260	0278	34481	2751			14652																					
129		OBS	0278	0278	34489	2752			14655																					

REFERENCE		SHIP CODE	LATITUDE ° ' / 10	LONGITUDE ° ' / 10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT		
31	540	EV	4725 N	04742 W		149	77	05	09	145	1965	002	9340		0243	02	32	2	2		X0	0		0106	
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB													
								30	508	176	039	033	8	06											
MESSNGR TIME HR 1/10	CAS- T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$	$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH	S C								
		STD	0000	-0036	3288	2644	0016025	0000	14447																
145		OBS	0000	-0036	32881	2644			14447																
		STD	0010	-0052	3289	2645	0015914	0016	14441																
		STD	0020	-0066	3289	2646	0015819	0032	14436																
		STD	0030	-0078	3290	2647	0015726	0048	14433																
145		OBS	0030	-0078	32898	2647			14433																
		STD	0050	-0097	3300	2655	0014871	0078	14429																
145		OBS	0060	-0106	33057	2660			14427																
		STD	0075	-0088	3315	2667	0013746	0114	14439																
145		OBS	0075	-0088	33149	2667			14439																
		STD	0100	-0009	3340	2684	0012143	0146	14483																
		STD	0125	0054	3361	2698	0010868	0175	14519																
		STD	0150	0100	3377	2708	0009930	0201	14546																
145		OBS	0190	0140	33916	2717			14573																
		STD	0200	0141	3393	2718	0008999	0248	14575																
145		OBS	0220	0142	33947	2719			14579																

REFERENCE		SHIP CODE	LATITUDE ° ' / 10	LONGITUDE ° ' / 10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT				
31	540	EV	4724 N	04757 W		149	77	05	09	159	1965	002	9341		0201	02	31	2	2		X0	0		0107		
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
						COLOR CODE	TRANS. INT	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
								29	509		169	039					028	8	09							
MESSNGR TIME of HR 1/10	CAS- T NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$	$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH	S C									
159		STD	0000	0008	3290	2643	0016089	0000	14467																	
		OBS	0000	0008	32897	2643			14467																	
		STD	0010	-0009	3293	2646	0015758	0016	14462																	
		STD	0020	-0020	3296	2649	0015478	0032	14459																	
		STD	0030	-0027	3301	2654	0015063	0047	14458																	
159		OBS	0045	-0029	33104	2661			14461																	
		STD	0050	-0027	3315	2665	0013988	0076	14463																	
159		OBS	0055	-0024	33177	2667			14466																	
159		OBS	0070	-0096	33215	2673			14435																	
		STD	0075	-0084	3325	2675	0012987	0110	14442																	
159		OBS	0090	-0039	33358	2682			14467																	
		STD	0100	0000	3342	2685	0012057	0141	14487																	
159		OBS	0100	0000	33417	2685			14487																	
159		OBS	0110	0025	33466	2688			14501																	
		STD	0125	0046	3350	2689	0011659	0171	14514																	
		STD	0150	0065	3360	2696	0011014	0199	14528																	
159		OBS	0150	0065	33599	2696			14528																	
159		OBS	T0175	0066	33732	2707			14534																	

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEM SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLE'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT					
31	540	EV	4722 N	04812 W	149	78	05	09	171	1965	002	9342	0174	02	30	2	2		X0		0	0108						
						WATER		WIND		AIR TEMP. °C																		
						COLOR CODE	TRANS. IM1	DIR.	SPEED OR FORCE	BARO- METER (mbs)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS													
									27	508	179	033	022	8	04													
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$		$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH											
171	OBS	STD	0000	-0011	3283	2638	0016533		0000	14458																		
		OBS	0000	-0011	32828	2638				14458																		
		STD	0010	-0043	3284	2641	0016308		0016	14445																		
		STD	0020	-0069	3285	2643	0016107		0033	14434																		
		STD	0030	-0089	3287	2644	0015942		0049	14427																		
171	OBS	STD	0050	-0112	3289	2647	0015666		0080	14420																		
		OBS	0065	-0115	32909	2649				14421																		
		STD	0075	-0090	3304	2658	0014573		0118	14436																		
		STD	0100	-0034	3331	2678	0012716		0152	14470																		
		STD	0125	0014	3351	2692	0011413		0182	14499																		
171	OBS	STD	0130	0023	33545	2694				14505																		
		STD	0150	0055	3365	2701	0010568		0210	14524																		
171	OBS	0160	0069	33688	2703					14533																		

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEM SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLE'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT				
31	540	EV	4701 N	04801 W		149	78	05	09	202	1965	002	9343	0150	01	24	5	4		X4	X 9		0109			
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. DBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. IM1	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB														
									25	509	169	000	+006	1	06											
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH									
202	OBS	STD	0000	0000	3284	2638	0016504		0000	14463																
		OBS	0000	0000	32838	2638				14463																
		STD	0010	-0005	3284	2639	0016471	0016	14462																	
202	OBS	STD	0012	-0007	32839	2639				14462																
		STD	0020	-0021	3284	2640	0016392	0033	14457																	
		STD	0030	-0037	3284	2640	0016315	0049	14451																	
202	OBS	STD	0030	-0037	32841	2640				14451																
		STD	0050	-0077	3293	2649	0015474	0081	14437																	
		OBS	0072	-0089	33088	2662			14437																	
202	OBS	STD	0075	-0086	3312	2665	0013976	0118	14440																	
		OBS	0097	-0061	33344	2682			14458																	
		STD	0100	-0053	3338	2684	0012101	0150	14462																	
202	OBS	STD	0125	0053	3364	2700	0010634	0179	14519																	
		OBS	0127	0065	33658	2701			14525																	

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSDEM SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4659 N	04738 W		149	67	05	09	218	1965	002	9344	0175	02	25	5	4		X4	X 9		0110
						WATER		WIND		BARO- METER (mbars)	AIR TEMP. °C		VIS. CODE	NO. DBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB											
										25 <td>510</td> <td>159</td> <td>011</td> <td>006</td> <td>1</td> <td>04</td> <th colspan="6"></th>	510	159	011	006	1	04							
MESSAGE# TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$		$\Sigma \Delta$ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH					
218		STD	0000	-0023	3288	2643		0016062		0000	14453												
		OBS	0000	-0023	32883	2643					14453												
		STD	0010	-0034	3291	2646		0015798		0016	14450												
		STD	0020	-0046	3294	2649		0015543		0032	14447												
		STD	0030	-0057	3297	2651		0015282		0047	14443												
218		STD	0050	-0079	3302	2656		0014769		0077	14437												
		STD	0075	-0108	3309	2663		0014132		0113	14429												
		OBS	0078	-0111	33098	2664					14428												
		OBS	0087	-0051	33265	2675					14460												
		STD	0100	-0027	3335	2681		0012428		0146	14474												
218		STD	0125	0020	3352	2692		0011375		0176	14502												
		STD	0150	0067	3369	2703		0010362		0203	14530												
		OBS	0169	0102	33813	2711					14551												

REFERENCE STATION CODE	ID. NO.	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
						10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT					
31	540	EV	4700 N	04730 W		149	77	05	09	237	1965	002	9345	0220	02	20	2	2		X4	X	9		0111			
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
						COLOR CODE	TRANS. mm	DIR.	SPEED OR FORCE		DRY BULB	WET BULB															
										24	508	152	+006	+008	1	07											
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	S C C									
		STD	0000	-0035	3287	2643	0016106		0000	14447																	
237		OBS	0000	-0035	32871	2643				14447																	
		STD	0010	-0038	3287	2643	0016097		0016	14447																	
237		OBS	0010	-0038	32870	2643				14447																	
		STD	0020	-0084	3288	2645	0015880		0032	14428																	
237		OBS	0021	-0088	32877	2645				14426																	
		STD	0030	-0086	3291	2648	0015606		0048	14429																	
		STD	0050	-0083	3299	2654	0014995		0078	14435																	
237		OBS	0063	-0080	33057	2659				14439																	
		STD	0075	-0049	3314	2665	0013961		0115	14457																	
		STD	0100	0008	3329	2674	0013064		0148	14489																	
237		OBS	0105	0018	33316	2676				14495																	
		STD	0125	0052	3340	2681	0012453		0180	14515																	
237		OBS	0131	0062	33436	2683				14521																	
		STD	0150	0092	3355	2691	0011549		0210	14539																	
		STD	0200	0158	3398	2721	0008745		0261	14583																	
237		OBS	0210	0170	34088	2729				14592																	

REFERENCE STATION CODE	ID. NO.	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER																										
						10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT																									
						WATER		WIND		BARO- METER		AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																														
COLOR CODE	TRANS. mm	DIR.	SPEED OR FORCE	DRY BULB	WET BULB																																											
31	540	EV	4700 N	04716 W	149	77	05	10	019	1965	002	9346	0710	05	23	3	2		X4	X	9	0112																										
<table><tr><td colspan="2">WATER</td><td colspan="2">WIND</td><td>BARO- METER</td><td colspan="2">AIR TEMP. °C</td><td rowspan="2">VIS. CODE</td><td rowspan="2">NO. OBS. DEPTHS</td><td rowspan="2">SPECIAL OBSERVATIONS</td></tr><tr><td>COLOR CODE</td><td>TRANS. mm</td><td>DIR.</td><td>SPEED OR FORCE</td><td>DRY BULB</td><td>WET BULB</td></tr><tr><td></td><td></td><td></td><td>20</td><td>514</td><td>146</td><td>+006</td><td>+006</td><td>1</td><td>09</td><td></td></tr></table>																						WATER		WIND		BARO- METER	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS	COLOR CODE	TRANS. mm	DIR.	SPEED OR FORCE	DRY BULB	WET BULB				20	514	146	+006	+006	1	09	
WATER		WIND		BARO- METER	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																																							
COLOR CODE	TRANS. mm	DIR.	SPEED OR FORCE	DRY BULB	WET BULB																																											
			20	514	146	+006	+006	1	09																																							
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	°C																															
		STD	0000	0076	3320	2664	0014096	0000	14503																																							
019		OBS	0000	0076	33203	2664			14503																																							
019		OBS	0009	0060	33206	2665			14497																																							
		STD	0010	0052	3321	2666	0013913	0014	14493																																							
		STD	0020	-0017	3325	2672	0013275	0028	14464																																							
019		OBS	0022	-0028	33258	2674			14459																																							
		STD	0030	-0020	3332	2678	0012724	0041	14465																																							
		STD	0050	0003	3346	2688	0011755	0065	14481																																							
		STD	0075	0041	3363	2700	0010648	0093	14505																																							
019		OBS	0080	0050	33661	2702			14510																																							
		STD	0100	0097	3376	2707	0009984	0119	14536																																							
		STD	0125	0148	3391	2716	0009185	0143	14565																																							
019		OBS	0126	0150	33915	2716			14566																																							
		STD	0150	0185	3409	2728	0008098	0164	14588																																							
019		OBS	0174	0220	34246	2737			14610																																							
		STD	0200	0267	3440	2746	0006450	0201	14637																																							
		STD	0250	0334	3462	2757	0005447	0231	14677																																							
019		OBS	0258	0342	34647	2759			14682																																							
		STD	0300	0354	3470	2762	0005085	0257	14695																																							
019		OBS	0376	0371	34766	2765			14715																																							
		STD	0400	0375	3478	2766	0004789	0306	14721																																							
		STD	0500	0382	3484	2770	0004506	0353	14741																																							
019		OBS	0519	0382	34843	2770			14744																																							



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INCH	MARSOEN SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S			DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER	
CTRY CODE	IO. NO.						10°	1°	MO	DAY		HR.1/10	CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT		
31	540	EV	4700 N	04700 W		149	77	05	10	037	1965	002	9347		1262	12	23	3	2		X4	X 9		0113	
							WATER		WIND				AIR TEMP. °C												
							COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mba)		DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
									22	511	132		000	+006	3	11									
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ σ OYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CC							
		STD	0000	0224	3381	2702	0010469		0000	14577															
037		OBS	0000	0224	33808	2702				14577															
		STD	0010	0270	3399	2713	0009459		0010	14601															
037		OBS	0015	0289	34069	2717				14611															
		STD	0020	0289	3407	2718	0009019		0019	14612															
		STD	0030	0289	3408	2718	0008949		0028	14614															
		STD	0050	0289	3411	2721	0008735		0046	14617															
037		OBS	0073	0289	34183	2727				14622															
		STD	0075	0293	3420	2728	0008106		0067	14625															
		STD	0100	0332	3443	2742	0006740		0085	14649															
		STD	0125	0352	3457	2751	0005895		0101	14663															
037		OBS	0145	0354	34638	2757				14668															
		STD	0150	0351	3464	2757	0005380		0115	14668															
037		OBS	0169	0341	34651	2759				14667															
		STD	0200	0353	3471	2762	0004916		0141	14678															
		STD	0250	0368	3478	2767	0004583		0165	14693															
037		OBS	0267	0371	34803	2768				14698															
		STD	0300	0373	3481	2768	0004454		0187	14704															
037		OBS	T0389	0375	34843	2771				14720															
		STD	0400	0375	3485	2771	0004266		0231	14722															
		STD	0500	0373	3488	2774	0004110		0273	14738															
037		OBS	T0586	0371	34897	2776				14752															
		STD	0600	0370	3490	2776	0004040		0314	14754															
		STD	0700	0366	3490	2776	0004090		0354	14769															
037		OBS	0782	0362	34895	2776				14780															
		STD	0800	0361	3490	2776	0004128		0395	14783															
		STD	0900	0357	3490	2777	0004152		0437	14798															
037		OBS	T0993	0354	34898	2777				14812															
		STD	1000	0354	3490	2777	0004192		0479	14813															
		STD	1100	0352	3490	2777	0004265		0521	14829															
037		OBS	1166	0352	34894	2777				14840															

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSOEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4659 N	04630 W		149	66	05	10	068	1965	002	9349	0360	03	22	3	2		X1	3	2	0115
						WATER		WIND		AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mba)	DRY BULB	WET BULB											
									20	514	098	039	028	8	07								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ θ OYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	S C C					
068		STD	0000	0476	3436	2722	0008609		0000	14692													
		OBS	0000	0476	34360	2722				14692													
		STD	0010	0472	3436	2722	0008580		0009	14692													
		STD	0020	0468	3436	2723	0008556		0017	14692													
		STD	0030	0465	3436	2723	0008534		0026	14692													
068		STD	0050	0457	3436	2724	0008481		0043	14692													
		OBS	0052	0456	34357	2724				14692													
068		STD	0075	0417	3437	2729	0007996		0063	14680													
		OBS	0082	0414	34392	2731				14680													
068		STD	0100	0451	3451	2736	0007324		0082	14700													
		OBS	0112	0453	34570	2741				14703													
068		STD	0125	0416	3460	2747	0006307		0100	14691													
		OBS	0142	0380	34643	2754				14679													
068		STD	0150	0382	3467	2756	0005460		0114	14681													
		STD	0200	0392	3479	2765	0004707		0140	14695													
		OBS	T0227	0394	34839	2769				14701													
068		STD	0250	0393	3485	2770	0004315		0162	14705													
		STD	0300	0385	3488	2772	0004092		0183	14710													
068		OBS	T0330	0376	34890	2775				14711													

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSOEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4658 N	04617 W		149	66	05	10	079	1965	002	9350	0311	03	19	3	2		X2	2	8	0116
						WATER		WIND		BARO- METER (mb)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB												
									20	513	098	044	033	8	05								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta \theta$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{dl/l}$	TOTAL-P $\mu\text{g} \cdot \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{dl/l}$	pH	S C C					
079		STD	0000	0419	3435	2727	0008072		0000	14668													
		OBS	0000	0419	34353	2727				14668													
		STD	0010	0419	3436	2728	0008041		0008	14670													
		STD	0020	0420	3436	2728	0008017		0016	14672													
		STD	0030	0420	3437	2729	0007984		0024	14674													
		STD	0050	0421	3438	2729	0007929		0040	14677													
079		STD	0075	0422	3439	2730	0007865		0060	14682													
		OBS	0080	0422	34397	2731				14683													
079		STD	0100	0387	3445	2738	0007117		0078	14672													
		OBS	0124	0376	34555	2748				14673													
079		STD	0125	0377	3456	2748	0006214		0095	14674													
		OBS	0149	0400	34716	2758				14689													
079		STD	0150	0400	3472	2758	0005287		0110	14689													
		STD	0200	0392	3478	2764	0004757		0135	14695													
		STD	0250	0384	3485	2770	0004233		0157	14701													
079		OBS	T0272	0380	34877	2773				14703													

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSOEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4700 N	04600 W		149	76	05	10	095	1965	002	9351	0302	03	21	3	2		X6	5	8	0117
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB											
									20	518	085	044	033	7	04								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta \theta$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{dl/l}$	TOTAL-P $\mu\text{g} \cdot \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{dl/l}$	pH	S C C					
095		STD	0000	0437	3439	2728	0007976		0000	14676													
		OBS	0000	0437	34390	2728				14676													
		STD	0010	0434	3440	2729	0007904		0008	14676													
		STD	0020	0431	3440	2730	0007838		0016	14677													
		STD	0030	0428	3441	2731	0007766		0024	14677													
		STD	0050	0422	3442	2733	0007628		0039	14678													
		STD	0075	0415	3444	2735	0007457		0058	14680													
095		STD	0100	0408	3446	2737	0007278		0076	14681													
		OBS	0102	0407	34457	2737				14681													
		STD	0125	0405	3458	2747	0006345		0093	14686													
		STD	0150	0402	3469	2756	0005512		0108	14690													
095		STD	0200	0395	3484	2769	0004363		0133	14697													
		OBS	0204	0394	34848	2769				14698													
095		STD	0250	0385	3486	2771	0004135		0154	14702													
		OBS	0280	0378	34873	2773				14704													

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT
31	540	EV	4722 N	04818 W	149	78	05	19	094	1965	003	9352	0159	01	36	4	2		X4	7	8	0118	
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS	SPECIAL OBSERVATIONS						
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbars)	DRY BULB	WET BULB											
								32	S18	156	028	028	2	04									
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C						
094		STD	0000	0140	3284	2630	0017273	0000	14526														
		OBS	0000	0140	32835	2630			14526														
		STD	0010	0067	3284	2635	0016812	0017	14495														
		STD	0020	0006	3285	2639	0016433	0034	14469														
		STD	0030	-0044	3287	2643	0016065	0050	14448														
094		STD	0050	-0111	3294	2651	0015301	0081	14421														
		OBS	0050	-0111	32938	2651			14421														
		STD	0075	-0124	3309	2664	0014080	0118	14421														
094		OBS	0080	-0127	33122	2666			14421														
		STD	0100	-0106	3325	2676	0012897	0152	14436														
		STD	0125	-0045	3343	2688	0011744	0183	14471														
094		OBS	0145	0032	33576	2696			14512														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT		
31	540	EV	4722 N	04807 W	149	78	05	19	106	1965	003	9353	0181	02	35	3	3		X4	7	8	0119			
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mb)	DRY BULB	WET BULB													
								34		S16	173	033	033	5	05										
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C					
		STD	0000	0133	3282	2629		0017374		0000	14523														
106		OBS	0000	0133	32816	2629					14523														
		STD	0010	0075	3283	2634		0016931		0017	14499														
		STD	0020	0025	3284	2638		0016567		0034	14478														
		STD	0030	-0017	3286	2641		0016259		0050	14460														
		STD	0050	-0076	3289	2646		0015807		0082	14437														
106		OBS	0050	-0076	32887	2646					14437														
		STD	0075	-0089	3301	2656		0014806		0121	14436														
106		OBS	0090	-0097	33109	2664					14437														
		STD	0100	-0053	3327	2676		0012942		0155	14461														
		STD	0125	0025	3354	2694		0011241		0186	14505														
106		OBS	0140	0050	33630	2700					14520														
		STD	0150	0052	3363	2700		0010680		0213	14522														
106		OBS	0165	0055	33638	2700					14526														

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT
31	540	EV	4723 N	04751 W	149	77	05	19	122	1965	003	9354	0210	02	35	3	3		X4	6	8		0120
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
		COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE			DRY BULB	WET BULB														
								34		S18	186	039	033	6	07								
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C				
		STD	0000	0106	3283	2632		0017129		0000	14511												
122		OBS	0000	0106	32827	2632					14511												
		STD	0010	0100	3283	2632		0017083		0017	14510												
122		OBS	0017	0095	32829	2633					14509												
		STD	0020	0069	3284	2635		0016822		0034	14498												
		STD	0030	-0006	3287	2641		0016223		0051	14466												
122		OBS	0043	-0075	32912	2648					14436												
		STD	0050	-0076	3293	2649		0015477		0082	14437												
		STD	0075	-0081	3302	2656		0014759		0120	14441												
122		OBS	0084	-0082	33061	2660					14442												
		STD	0100	-0069	3315	2667		0013794		0156	14452												
122		OBS	0110	-01500	33200	26730																	
		STD	0125	-0049	3323	2672		0013252		0190	14466												
		STD	0150	-0030	3334	2680		0012491		0222	14481												
122		OBS	0172	-0012	33485	2691					14495												
122		OBS	T0193	0063	33667	2702					14535												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSSEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			SPECIAL OBSERVATIONS					TYPE	AMT	
																WATER COLOR CODE	WIND TRANS. (m)	WIND DIR.	WIND SPEED OR FORCE				
31	540	EV	4723 N	04733 W		149	77	05	19	137	1965	003	9355	0267	02	36	3	4		X2	6	8	0121

REFERENCE CTRY CODE	ID. NO.	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSEEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
							10"	1"	MO		DAY	HR./1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE
31	540	EV	4722 N	04718 W		149	77	05	19	150	1965	003	9356	0329	03	36	3	2		X2	6	8	0122
							WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS				
							COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB	VIS. CODE		NO. OBS. DEPTHS								
											33	513	210	022	017	8	05						
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	S C C					
		STD	0000	0243	3307	2641	0016241		0000	14575													
150		OBS	0000	0243	33065	2641				14575													
		STD	0010	0160	3310	2650	0015389		0016	14541													
		STD	0020	0090	3313	2657	0014730		0031	14511													
		STD	0030	0034	3317	2664	0014122		0045	14488													
150		OBS	0045	-0027	33237	2672				14463													
		STD	0050	-0025	3325	2673	0013231		0073	14465													
		STD	0075	-0015	3335	2680	0012503		0105	14475													
150		OBS	0098	-0006	33508	2693				14486													
		STD	0100	-0000	3353	2694	0011195		0134	14489													
		STD	0125	0069	3376	2709	0009815		0161	14528													
150		OBS	0126	0072	33768	2709				14529													
		STD	0150	0131	3396	2721	0008695		0184	14563													
		STD	0200	0228	3430	2741	0006873		0223	14618													
		STD	0250	0293	3452	2753	0005811		0254	14658													
		STD	0300	0324	3464	2760	0005239		0282	14681													
150		OBS	T0307	0326	34648	2760				14683													



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INCHES	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT			
31	540	EV	4722 N	04704 W		149	77	05	19	167	1965	003	9357	0927	09	36	3	2		X2	6	8		0123		
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
									33	511	220	056	050	8	11											
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %.	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SIO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C								
167		STD	0000	0314	3350	2670	0013525		0000	14612																
		OBS	0000	0314	33500	2670				14612																
		STD	0010	0269	3364	2685	0012097		0013	14596																
167		STD	0020	0205	3373	2697	0010926		0024	14571																
		OBS	0025	0167	33761	2703				14555																
		OBS	0029	0133	33778	2706				14541																
167		STD	0030	0140	3379	2707	0010021		0035	14544																
		OBS	0049	0252	34008	2716				14600																
		STD	0050	0252	3401	2716	0009183		0054	14600																
167		STD	0075	0251	3414	2726	0008208		0076	14606																
		STD	0100	0251	3427	2737	0007234		0095	14611																
		OBS	0122	0250	34376	2745				14616																
167		STD	0125	0257	3439	2746	0006396		0112	14620																
		OBS	0146	0297	34490	2750				14642																
		STD	0150	0301	3450	2751	0005966		0128	14644																
167		STD	0200	0339	3466	2760	0005155		0155	14671																
		OBS	T0219	0350	34705	2762				14680																
		STD	0250	0356	3473	2764	0004838		0180	14688																
167		STD	0300	0365	3476	2765	0004747		0204	14700																
		OBS	0389	0376	34809	2768				14720																
		STD	0400	0376	3481	2768	0004577		0251	14722																
167		STD	0500	0378	3484	2770	0004465		0296	14740																
		OBS	T0580	0380	34856	2771				14754																
		STD	0600	0380	3486	2772	0004427		0341	14757																
167		STD	0700	0381	3487	2772	0004455		0385	14775																
		OBS	0764	0382	34872	2772				14786																
		STD	0800	0380	3488	2773	0004493		0430	14791																
167		OBS	T0856	0374	34879	2774				14798																

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	MARS DEN SQUARE	STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"		MO	DAY			HR.1/10	CRUISE NO.	STATION NUMBER		DIR.	HGT		PER
31	540	EV	4721 N	04650 W	149	76	05 19	183	1965	003	9358	1225	11	36	2	3	X2	6	8	0124
						WATER		WIND		AIR TEMP. °C										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mbs)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS					
								33	509	234	050	044	8	11						
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C			
183		STD	0000	0386	3391	2696	0011069	0000	14648											
		OBS	0000	0386	33912	2696			14648											
		STD	0010	0313	3399	2709	0009823	0010	14620											
		STD	0020	0269	3405	2718	0009003	0020	14603											
183		OBS	0021	0266	34053	2718			14602											
		STD	0030	0275	3411	2722	0008608	0029	14608											
183		OBS	0047	0293	34161	2724			14619											
		STD	0050	0263	3416	2727	0008132	0045	14607											
183		OBS	0058	0193	34161	2733			14578											
		STD	0075	0223	3427	2739	0006999	0064	14595											
		STD	0100	0262	3442	2748	0006197	0081	14618											
		STD	0125	0295	3454	2754	0005594	0096	14638											
183		OBS	0136	0307	34583	2757			14646											
		STD	0150	0317	3461	2758	0005285	0109	14653											
		STD	0200	0348	3471	2763	0004867	0135	14676											
183		OBS	T0236	0364	34763	2766			14689											
		STD	0250	0366	3477	2766	0004638	0158	14692											
		STD	0300	0370	3480	2768	0004498	0181	14703											
		STD	0400	0377	3484	2770	0004361	0225	14723											
183		OBS	T0418	0378	34846	2771			14726											
		STD	0500	0378	3486	2772	0004317	0269	14740											
		STD	0600	0379	3488	2773	0004264	0312	14757											
183		OBS	0627	0379	34884	2774			14762											
		STD	0700	0374	3489	2775	0004232	0354	14772											
		STD	0800	0369	3490	2776	0004218	0396	14786											
183		OBS	T0832	0367	34897	2776			14791											
		STD	0900	0364	3490	2777	0004211	0439	14801											
		STD	1000	0360	3490	2777	0004246	0481	14816											
183		OBS	1065	0357	34902	2777			14826											
		STD	1100	0351	3490	2778	0004202	0523	14829											
183		OBS	T1119	0347	34904	2779			14830											

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRI INDIC	MARSOEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.						10°	1°	MO		DAY	HR./10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE
31	540	EV	4722 N	04634 W	149	76 05 19	202	1965	003	9359		1253	11	35	4	4			X1	6	6		0125
							WATER		WIND		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
							COLOR CODE	TRANS. mm	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB					WET BULB						
										36	509	237	067	061	8	09							
MESSNGR TIME OF HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME AND MALT-2107		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH						
202		STD	0000	0494	3408	2698	0010897		0000	14695													
		OBS	0000	0494	34081	2698				14695													
		STD	0010	0489	3418	2706	0010111		0011	14696													
		STD	0020	0482	3426	2713	0009446		0020	14696													
		STD	0030	0475	3434	2720	0008781		0029	14696													
		STD	0050	0456	3447	2733	0007625		0046	14693													
202		STD	0075	0427	3458	2745	0006522		0063	14687													
		STD	0100	0391	3464	2753	0005729		0079	14676													
		OBS	0119	0359	34645	2757				14666													
		STD	0125	0344	3463	2757	0005368		0093	14660													
		OBS	0134	0331	34626	2758				14656													
		STD	0150	0358	3469	2760	0005073		0106	14671													
202		OBS	0165	0380	34745	2763				14684													
		STD	0200	0379	3477	2765	0004728		0130	14690													
		STD	0250	0378	3480	2767	0004538		0153	14698													
		STD	0300	0377	3482	2769	0004424		0176	14706													
		STD	0400	0375	3486	2772	0004194		0219	14722													
		OBS	T0414	0375	34867	2773				14725													
202		STD	0500	0373	3488	2774	0004110		0260	14738													
		STD	0600	0370	3489	2775	0004092		0301	14754													
		OBS	T0619	0369	34894	2776				14756													
		STD	0700	0366	3490	2776	0004061		0342	14769													
		STD	0800	0362	3490	2777	0004102		0383	14784													
		OBS	0825	0361	34902	2777				14787													
202		STD	0900	0355	3490	2778	0004092		0424	14797													
		STD	1000	0349	3490	2778	0004097		0465	14811													
		OBS	T1027	0348	34903	2778				14815													
202		OBS	T1067	0347	34902	2778				14822													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRI INDIC	MARSDEN SQUARE	STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER									
CTRY CODE	ID. NO.						10°	1°	MO		DAY	HR./10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT							
31	540	EV	4722 N	04620 W		149	76	05	19	218	1965	003	9360		0540	05	34	B	4		X1	6	2		0126						
						WATER		WIND		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS																	
						COLOR CODE	TRANS. mm	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB					WET BULB															
								36		504		240		050		044		8		07											
MESSNGR TIME OF HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME AND MALT-2107		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH														
218		STD	0000	0472	3422	2711	0009640		0000	14688																					
		OBS	0000	0472	34217	2711				14688																					
		STD	0010	0469	3422	2711	0009600		0010	14689																					
218		OBS	0015	0468	34233	2713				14689																					
		STD	0020	0404	3427	2722	0008566		0019	14664																					
		OBS	0024	0360	34292	2729				14646																					
218		STD	0030	0360	3432	2731	0007778		0027	14648																					
		STD	0050	0362	3440	2737	0007204		0042	14653																					
		OBS	0074	0363	34491	2744				14658																					
		STD	0075	0363	3449	2744	0006540		0059	14659																					
		STD	0100	0368	3455	2748	0006213		0075	14666																					
		STD	0125	0374	3460	2752	0005881		0090	14673																					
218		STD	0150	0379	3465	2755	0005556		0104	14680																					
		STD	0200	0389	3476	2763	0004906		0131	14694																					
		OBS	T0246	0399	34858	2770				14707																					
		STD	0250	0398	3486	2770	0004293		0154	14707																					
		STD	0300	0392	3488	2772	0004128		0175	14713																					
		OBS	T0397	0382	34893	2774				14725																					
218		STD	0400	0382	3489	2774	0004041		0215	14725																					
		STD	0500	0374	3488	2774	0004121		0256	14738																					
		OBS	0501	0374	34879	2774				14739																					

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT				
31	540	EV	4720 N	04606 W		149	76	05	19	233	1965	003	9361	0393	04	34	5	3		X1	7	2	0127			
						WATER		WIND		BARO- METER (mbars)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS											
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB														
										34	506	247	056	039	8	07										
MESSNGR TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SI O <sub>4</sub> -Si μg - at/l	pH	S C								
233		STD	0000	0502	3420	2706	0010091		0000	14700																
		OBS	0000	0502	34200	2706				14700																
		STD	0010	0465	3424	2713	0009404		0010	14687																
		STD	0020	0435	3428	2720	0008802		0019	14677																
233		STD	0030	0412	3432	2726	0008279		0027	14669																
		OBS	0034	0404	34343	2728				14667																
		STD	0050	0404	3444	2736	0007315		0043	14671																
		STD	0075	0404	3458	2747	0006287		0060	14677																
233		OBS	0086	0404	34625	2751				14679																
		STD	0100	0411	3467	2753	0005706		0075	14685																
		STD	0125	0420	3474	2758	0005299		0089	14694																
		OBS	0137	0423	34767	2760				14698																
233		STD	0150	0423	3478	2761	0005053		0102	14700																
		OBS	0189	0422	34830	2765				14707																
		STD	0200	0431	3486	2766	0004592		0126	14713																
		OBS	T0241	0452	34932	2770				14729																
233		STD	0250	0447	3493	2770	0004299		0148	14728																
		STD	0300	0416	3491	2772	0004148		0169	14724																
		OBS	T0370	0374	34888	2775				14717																

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT		
31	540	EV	4721 N	04548 W		149	75	05	20	006	1965	003	9362	0311	03	34	5	3		X0	X0	0128			
						WATER		WIND		BARO- METER	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB													
								34	506		251	056				050	8	04							
MESSNGR TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		S Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SI O <sub>4</sub> -Si μg - at/l	pH	S C							
		STD	0000	0545	3431	2710	0009747		0000	14719															
006		OBS	0000	0545	34310	2710				14719															
		STD	0010	0541	3431	2710	0009713		0010	14719															
006		OBS	0015	0538	34310	2711				14719															
		STD	0020	0528	3432	2713	0009503		0019	14716															
		STD	0030	0510	3433	2715	0009238		0029	14710															
		STD	0050	0475	3437	2723	0008578		0047	14700															
		STD	0075	0438	3441	2730	0007912		0067	14689															
		STD	0100	0408	3445	2736	0007327		0086	14681															
		STD	0125	0384	3450	2743	0006734		0104	14676															
006		OBS	0142	0371	34534	2747				14673															
		STD	0150	0372	3455	2748	0006259		0120	14675															
		STD	0200	0377	3466	2756	0005529		0149	14687															
		STD	0250	0382	3477	2764	0004800		0175	14699															
006		OBS	T0290	0386	34868	2772				14709															

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT		
31	540	EV	4722 N	04523 W		149	75	05	20	027	1965	003	9363	0247	02	35	2	2		X0	X 0		0129		
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbars)	DRY BULB	WET BULB													
									31	506	247	050	044	8	04										
MESSNGR TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SI O <sub>4</sub> -Si μg - at/l	pH	S C							
		STD	0000	0551	3426	2705	0010220		0000	14721															
027		OBS	0000	0551	34256	2705				14721															
		STD	0010	0496	3429	2714	0009361		0010	14701															
		STD	0020	0447	3432	2722	0008626		0019	14682															
027		OBS	0025	0426	34335	2725				14675															
		STD	0030	0420	3435	2727	0008134		0027	14673															
		STD	0050	0400	3439	2732	0007652		0043	14669															
		STD	0075	0381	3446	2740	0006961		0061	14666															
		STD	0100	0369	3452	2746	0006414		0078	14666															
		STD	0125	0365	3460	2752	0005833		0093	14669															
027		OBS	0125	0365	34595	2752				14669															
		STD	0150	0368	3467	2758	0005321		0107	14675															
		STD	0200	0396	3483	2768	0004441		0132	14698															
027		OBS	0200	0396	34831	2768				14698															

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLES	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT		
31	540	EV	4722 N	04452 W		149	74	05	20	048	1965	003	9364	0214	02	35	2	2		X0		0		0130
						WATER		WIND		BARO- METER (mba)		AIR TEMP. °C		ND. OBS. DEPTHS		SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. IM1	DIR.	SPEED OR FORCE			DRY BULB	WET BULB	VIS. CODE										
									31	506	247	050	044	8	05									
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CC						
		STD	0000	0536	3430	2710	0009727		0000	14716														
	048	OBS	0000	0536	34299	2710				14716														
		STD	0010	0482	3433	2719	0008910		0009	14695														
		STD	0020	0442	3435	2725	0008348		0018	14681														
	048	OBS	0025	0427	34361	2727				14675														
		STD	0030	0422	3437	2728	0008041		0026	14674														
		STD	0050	0407	3438	2731	0007789		0042	14671														
	048	OBS	0051	0406	34382	2731				14671														
		STD	0075	0395	3440	2734	0007551		0061	14671														
		STD	0100	0384	3444	2738	0007161		0080	14671														
	048	OBS	0102	0383	34441	2738				14671														
		STD	0125	0386	3450	2742	0006758		0097	14677														
		STD	0150	0390	3459	2749	0006141		0113	14684														
	048	OBS	0177	0394	34705	2758				14691														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARS DEN SQUARE		STATION TIME IGMT			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4623 N	04511 W		149	65	05	20	108	1965	003	9365	2058	12	34	6	4		X1	4	2	0131
						WATER		WIND		BARO- METER (mba)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. IM1	DIR.	SPEED OR FORCE		DRY BULB	WET BULB											
									01	510	274	089	072	8	09								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH						
		STD	0000	0571	3440	2713	0009396		0000	14731													
	108	OBS	0000	0571	34397	2713				14731													
		STD	0010	0518	3442	2722	0008629		0009	14712													
		STD	0020	0472	3444	2729	0007988		0017	14694													
		STD	0030	0433	3446	2735	0007424		0025	14680													
	108	OBS	0030	0433	34462	2735				14680													
		STD	0050	0423	3452	2740	0006906		0039	14680													
		STD	0075	0412	3459	2747	0006293		0056	14680													
		STD	0100	0403	3465	2753	0005775		0071	14682													
		STD	0125	0396	3470	2757	0005352		0085	14683													
	108	OBS	0128	0395	34707	2758				14684													
		STD	0150	0394	3473	2760	0005128		0098	14687													
		STD	0200	0391	3479	2765	0004694		0123	14695													
		STD	0250	0388	3483	2769	0004410		0145	14702													
	108	OBS	T0262	0387	34842	2770				14704													
		STD	0300	0395	3486	2771	0004276		0167	14714													
		STD	0400	0415	3492	2773	0004149		0209	14740													
	108	OBS	0411	0417	34929	2773				14743													
		STD	0500	0391	3491	2775	0004082		0250	14746													
		STD	0600	0371	3490	2776	0004028		0291	14754													
	108	OBS	T0635	0366	34897	2776				14758													
		STD	0700	0365	3490	2776	0004079		0331	14768													
		STD	0800	0363	3490	2776	0004143		0372	14784													
	108	OBS	0844	0362	34895	2776				14791													
		STD	0900	0359	3490	2777	0004189		0414	14799													
		STD	1000	0354	3489	2777	0004222		0456	14813													
	108	OBS	T1075	0352	34893	2777				14825													
		STD	1100	0351	3489	2777	0004298		0499	14829													
	108	OBS	T1163	0350	34890	2777				14839													



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARSDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER							
CTRY CODE	ID. NO.						10"	1"	MO		DAY	HR.1/10			CRUISE NO.	STATION NUMBER	DIR.		HGT	PER		SEA	TYPE	AMT				
31	540	EV	4619 N	04550 W		149	65	05	20	138	1965	003	9366		0640	06	36	3	3		X1	0	3			0132		
							WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
							COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB															
										08	507	281		072	061	8	08											
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DYN. M. $\times 10^3$		SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C									
		STD	0000	0562	3409	2690	0011620		0000		14723																	
138		OBS	0000	0562	34086	2690					14723																	
		STD	0010	0487	3409	2699	0010764		0011		14694																	
		STD	0020	0429	3411	2707	0010057		0022		14672																	
138		OBS	0020	0429	34105	2707					14672																	
		STD	0030	0435	3416	2710	0009710		0031		14677																	
		STD	0050	0446	3425	2716	0009169		0050		14686																	
		STD	0075	0460	3435	2723	0008591		0073		14697																	
138		OBS	0086	0466	34393	2725					14702																	
		STD	0100	0449	3442	2729	0007981		0093		14698																	
		STD	0125	0419	3449	2738	0007167		0112		14690																	
		STD	0150	0389	3457	2748	0006285		0129		14683																	
138		OBS	0152	0387	34582	2749					14683																	
		STD	0200	0469	3484	2761	0005158		0158		14728																	
138		OBS	T0218	0478	34887	2763					14735																	
		STD	0250	0437	3486	2766	0004710		0182		14723																	
138		OBS	T0289	0400	34845	2768					14714																	
		STD	0300	0397	3485	2769	0004405		0205		14715																	
		STD	0400	0375	3490	2775	0003892		0247		14723																	
138		OBS	T0406	0374	34905	2776					14723																	
		STD	0500	0360	3491	2777	0003777		0285		14733																	
		STD	0600	0353	3491	2778	0003773		0323		14747																	
138		OBS	T0618	0352	34908	2778					14749																	

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT					
31	540	EV	4619 N	04635 W		149	66	05	20	173	1965	003	9367		0933	09	01	6	4		X1	4	2		0133			
						WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS													
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB																
										36	506	257	094	072	8	09												
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DYN. M. $\times 10^3$		SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C									
		STD	0000	0603	3419	2693	0011318		0000		14741																	
173		OBS	0000	0603	34191	2693					14741																	
		STD	0010	0572	3424	2701	0010596		0011		14731																	
		STD	0020	0542	3429	2709	0009887		0021		14721																	
		STD	0030	0515	3434	2716	0009219		0031		14712																	
		STD	0050	0464	3444	2729	0007935		0048		14696																	
		STD	0075	0410	3454	2743	0006648		0066		14679																	
		STD	0100	0367	3463	2755	0005568		0081		14666																	
173		OBS	0103	0362	34639	2756					14665																	
		STD	0125	0366	3468	2759	0005205		0095		14671																	
		STD	0150	0371	3472	2762	0004973		0108		14677																	
		STD	0200	0380	3479	2766	0004587		0131		14690																	
		STD	0250	0390	3485	2770	0004279		0154		14703																	
		STD	0300	0399	3489	2772	0004126		0175		14716																	
173		OBS	0306	0400	34893	2772					14718																	
		STD	0400	0398	3492	2775	0003989		0215		14733																	
		STD	0500	0390	3492	2775	0003996		0255		14746																	
173		OBS	T0509	0389	34923	2776					14747																	
173		OBS	0549	0384	34916	2776					14751																	
		STD	0600	0375	3492	2777	0003953		0295		14756																	
173		OBS	T0666	0368	34916	2777					14764																	
		STD	0700	0368	3491	2777	0003979		0335		14770																	
173		OBS	0732	0368	34912	2777					14775																	
		STD	0800	0366	3491	2777	0004066		0375		14785																	
173		OBS	T0834	0365	34911	2777					14791																	
		STD	0900	0362	3491	2778	0004098		0416		14800																	
173		OBS	T0915	0361	34912	2778					14802																	

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDIC	MARSOEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT			
31	540	EV	4619 N	04652 W		149	66	05	20	193	1965	003	9368		1280	08	34	2	2		X1	4	2		0134
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	DRY BULB	WET BULB													
								12		503	254	111	083	8	11										
MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %.	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - dl/l$	TOTAL-P $\mu g - dl/l$	NO <sub>2</sub> -N $\mu g - dl/l$	NO <sub>3</sub> -N $\mu g - dl/l$	SiO <sub>4</sub> -Si $\mu g - dl/l$	pH	S CC							
		STD	0000	0465	3409	2701	0010558		0000	14683															
193		OBS	0000	0465	34085	2701				14683															
		STD	0010	0404	3414	2712	0009535		0010	14660															
		STD	0020	0357	3420	2722	0008643		0019	14643															
		STD	0030	0325	3426	2729	0007906		0027	14632															
		STD	0050	0301	3437	2741	0006862		0042	14626															
193		OBS	0050	0301	34372	2741				14626															
		STD	0075	0350	3451	2746	0006324		0059	14653															
193		OBS	0075	0350	34505	2746				14653															
		STD	0100	0352	3453	2748	0006179		0074	14659															
		STD	0125	0355	3458	2752	0005844		0089	14664															
		STD	0150	0357	3463	2756	0005512		0104	14670															
193		OBS	0175	0359	34708	2762				14676															
		STD	0200	0439	3486	2765	0004679		0129	14716															
193		OBS	0230	0459	34922	2768				14730															
		STD	0250	0420	3487	2768	0004451		0152	14716															
193		OBS	T0255	0412	34865	2769				14714															
		STD	0300	0405	3487	2770	0004340		0174	14718															
		STD	0400	0390	3489	2773	0004141		0216	14729															
193		OBS	0400	0390	34888	2773				14729															
		STD	0500	0375	3489	2774	0004072		0257	14739															
193		OBS	T0544	0371	34888	2775				14745															
		STD	0600	0369	3490	2776	0004006		0298	14753															
193		OBS	T0666	0366	34904	2777				14763															
		STD	0700	0362	3490	2777	0003986		0338	14767															
193		OBS	T0798	0355	34902	2778				14780															
		STD	0800	0355	3490	2777	0004023		0378	14781															
193		OBS	0835	0355	34900	2777				14786															

REFERENCE CTRY CODE	ID. NO.	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDEXT	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER		
						10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT			
31	540	EV	4617 N	04714 W		149	67	05	20	214	1965	003	9369		0448	04	31	2	2		X1	0	1		0135
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB													
											09 <td>506</td> <td>247</td> <td>078</td> <td>056</td> <td>8</td> <td>08</td> <th colspan="8"></th>	506					247	078	056	8	08				
MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DTN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P µg - µl/l	TOTAL-P µg - µl/l	NO <sub>2</sub> -N µg - µl/l	NO <sub>3</sub> -N µg - µl/l	SiO <sub>4</sub> -Si µg - µl/l	pH	S CC							
		STD	0000	0239	3295	2633	0017051		0000	14572															
214		OBS	0000	0239	32954	2633				14572															
214		OBS	0009	0113	33079	2652				14519															
		STD	0010	0106	3308	2652	0015203		0016	14516															
		STD	0020	0048	3313	2660	0014500		0031	14492															
214		OBS	0023	0034	33150	2662				14487															
		STD	0030	0016	3321	2668	0013729		0045	14480															
214		OBS	0047	-0012	33325	2678				14472															
		STD	0050	-0015	3333	2679	0012664		0071	14471															
214		OBS	0061	-0018	33381	2683				14472															
		STD	0075	0034	3356	2695	0011144		0101	14501															
		STD	0100	0116	3386	2714	0009345		0127	14546															
214		OBS	0104	0128	33900	2717				14553															
		STD	0125	0160	3402	2724	0008437		0149	14572															
		STD	0150	0195	3415	2732	0007721		0169	14593															
		STD	0200	0256	3438	2745	0006505		0205	14632															
		STD	0250	0304	3456	2755	0005612		0235	14663															
214		OBS	T0286	0332	34654	2760				14682															
		STD	0300	0341	3469	2762	0005030		0262	14689															
214		OBS	T0383	0375	34791	2767				14718															

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	ENR INDIC	MARDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4619 N	04731 W		149	67 05 20	229	1965	003	9370	0192	02	03	3	4		X1	2	3		0136	
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	DRY BULB	WET BULB											
								09 <td>508</td> <td>244</td> <td>061</td> <td>050</td> <td>8</td> <td>07</td> <th colspan="2"></th> <th colspan="6"></th>		508	244	061	050	8	07								
MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> °		Σ Δ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PD <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>3</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH						
		STD	0000	0280	3298	2631	0017211		0000	14590													
229		OBS	0000	0280	32975	2631				14590													
		STD	0010	0138	3302	2645	0015855		0017	14530													
		STD	0020	0030	3307	2656	0014867		0032	14483													
229		OBS	0026	-0018	33091	2660				14462													
		STD	0030	-0022	3310	2661	0014368		0047	14462													
		STD	0050	-0039	3317	2667	0013782		0075	14458													
229		OBS	0062	-0050	33209	2671				14455													
		STD	0075	0029	3335	2678	0012717		0108	14496													
229		OBS	0088	0070	33452	2684				14518													
		STD	0100	0042	3348	2688	0011792		0138	14508													
229		OBS	0114	0037	33548	2694				14508													
		STD	0125	0059	3364	2700	0010668		0166	14522													
229		OBS	0129	0066	33666	2702				14526													
		STD	0150	0077	3376	2709	0009862		0192	14535													
229		OBS	0166	0085	33777	2709				14542													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	ENR INDIC	MARDEN SQUARE	STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.						10"	1"		MO	DAY			HR	1/10	CRUISE NO.	STATION NUMBER		DIR.	HGT		PER
31	540	EV	4619 N	04746 W		149	67 05 20	239	1965	003	9371	0146	01	03	3	4		X1	4	3		0137
							WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS					
							COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	DRY BULB	WET BULB									
									09	512	247	050	044	8					04			
MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$		$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PD <sub>4</sub> -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{at/l}$	pH	S C				
		STD	0000	0225	3284	2625	0017788		0000	14564												
239		OBS	0000	0225	32843	2625				14564												
		STD	0010	0118	3285	2633	0017025		0017	14518												
239		OBS	0012	0099	32852	2634				14510												
		STD	0020	0052	3289	2640	0016351		0034	14491												
		STD	0030	0001	3295	2647	0015643		0050	14470												
		STD	0050	-0069	3306	2659	0014508		0080	14442												
239		OBS	0060	-0089	33119	2665				14435												
		STD	0075	-0062	3321	2671	0013374		0115	14452												
		STD	0100	-0018	3338	2683	0012256		0147	14479												
		STD	0125	0027	3357	2696	0011054		0176	14506												
239		OBS	0125	0027	33566	2696				14506												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	ENR INDIC	MARDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4619 N	04800 W		149	68 05 21	010	1965	003	9372		0119	01	05	2	4		X0	X	0		0138
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	DRY BULB	WET BULB											
								09		510	247	050	044	8	04								
MESSAGE TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_{\theta}$		$\Sigma \Delta$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} \cdot \text{at/l}$	TOTAL-P $\mu\text{g} \cdot \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} \cdot \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} \cdot \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} \cdot \text{at/l}$	pH	S C					
010		STD	0000	0306	3295	2627	0017628		0000	14601													
		OBS	0000	0306	32948	2627				14601													
		STD	0010	0200	3300	2639	0016421		0017	14557													
010		STD	0020	0117	3305	2649	0015497		0033	14522													
		OBS	0025	0083	33068	2653				14508													
		STD	0030	0065	3307	2654	0015046		0048	14501													
010		STD	0050	0014	3314	2662	0014248		0078	14482													
		OBS	0059	0002	33186	2666				14478													
		STD	0075	0012	3330	2675	0013012		0112	14487													
010		OBS	0098	0026	33535	2693				14501													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT PER SEA	TYPE		AMT				
31	540	EV	4531 N	04908 W		149	59	05	21	072	1965	003	9373	0070	00	13	2	2		X4	7	8		0139
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
COLOR CODE		TRANS. MM	DIR.	SPEED OR FORCE	(mbars)	DRY BULB	WET BULB																	
				12	517	166	057	056	1	04														
MESSENGER TIME OF HR 1/10		CASST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C C						
072		085	STD	0000	0254	3293	2629	0017385	0000	14578														
			OBS	0000	0254	32925	2629			14578														
			STD	0010	0093	3295	2643	0016117	0017	14508														
			STD	0020	0011	3297	2649	0015516	0033	14473														
072		085	0020	0011	32973	2649			14473															
			STD	0030	0009	3300	2651	0015298	0048	14474														
072		085	0030	0009	33000	2651			14474															
			STD	0050	0071	3310	2655	0014887	0078	14507														
072		085	0050	0071	33095	2655			14507															

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT	
31	540	EV	4530 N	04846 W		149	58	05	21	098	1965	003	9374		0134	01	13	2	2		X4	7 8		0140
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbars)	DRY BULB	WET BULB												
								13	518	152	061	061	1					04						
MESSENGER TIME HR 1/10		CASST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	Si O <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C				
			STD	0000	0215	3290	2630		0017322		0000	14560												
098			OBS	0000	0215	32895	2630					14560												
			STD	0010	0144	3292	2637		0016653		0017	14531												
			STD	0020	0084	3295	2643		0016066		0033	14506												
098			OBS	0020	0084	32950	2643					14506												
			STD	0030	0044	3300	2649		0015469		0049	14490												
			STD	0050	-0015	3309	2659		0014496		0079	14468												
098			OBS	0065	-0041	33152	2666					14459												
			STD	0075	-0036	3320	2669		0013555		0114	14464												
			STD	0100	-0025	3330	2677		0012833		0147	14474												
098			OBS	0115	-0018	33365	2682					14481												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARSDEN SQUARE	STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.						10"	1"		MO	DAY			HR.1/10	CRUISE NO.	STATION NUMBER	DIR.		HGT	PER		SEA	TYPE	AMT
31	540	EV	4530 N	04832 W		149 58 05 21 113	1965	003 9375		0183	02	13	2	2		X4	7 8		0141					
						WATER		WIND		BARO- METER	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB												
								14	518	146	072	072	1	06										
MESSENGER TIME OF HR 1/10		CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C C						
			STD	0000	0185	3286	2629	0017400	0000	14547														
113			OBS	0000	0185	32857	2629			14547														
			STD	0010	0181	3286	2630	0017336	0017	14547														
113			OBS	0010	0181	32862	2630			14547														
			STD	0020	0046	3295	2645	0015863	0034	14489														
113			OBS	0025	-0003	32980	2650			14468														
			STD	0030	-0021	3299	2652	0015241	0050	14460														
113			OBS	0049	-0060	33066	2659			14446														
			STD	0050	-0058	3308	2660	0014396	0079	14448														
			STD	0075	-0018	3336	2681	0012414	0113	14474														
113			OBS	0089	-0001	33471	2690			14486														
			STD	0100	0003	3348	2690	0011569	0143	14490														
			STD	0125	0013	3351	2692	0011407	0171	14499														
			STD	0150	0022	3354	2694	0011247	0200	14508														
113			OBS	0162	0027	33550	2694			14512														



REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INCHES	MARDEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10	CRUISE NO.		STATION NUMBER	DR.			HGT	PER	SEA		TYPE	AMT	
31	540	EV	4532 N	04822 W		149	58	05	21	131	1965	003	9376	0649	06	12	2	2		X4	9	8	0142
						WATER		WIND		AIR TEMP. °C													
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
								14	S18	132	078	078	1	08									
MESSNGR TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH							
131		STD	0000	0264	3312	2644	0015994	0000	14585														
		OBS	0000	0264	33119	2644			14585														
		STD	0010	0255	3312	2645	0015916	0016	14582														
		STD	0020	0245	3312	2645	0015846	0032	14580														
131		OBS	0020	0245	33120	2645			14580														
		STD	0030	-0016	3315	2664	0014048	0047	14465														
131		OBS	0030	-0016	33149	2664			14465														
		STD	0050	0004	3337	2681	0012446	0073	14480														
131		STD	0075	0038	3363	2700	0010639	0102	14504														
		OBS	0075	0038	33629	2700			14504														
		STD	0100	0103	3386	2715	0009262	0127	14540														
		STD	0125	0159	3406	2727	0008127	0149	14572														
131		STD	0150	0208	3423	2737	0007217	0168	14600														
		OBS	0165	0234	34324	2743			14615														
		STD	0200	0270	3444	2749	0006175	0201	14638														
		STD	0250	0312	3458	2756	0005537	0231	14667														
131		OBS	T0297	0340	34676	2761			14688														
		STD	0300	0341	3468	2761	0005105	0257	14689														
131		OBS	T0379	0365	34761	2765			14713														
		STD	0400	0366	3478	2767	0004696	0306	14717														
		STD	0500	0372	3483	2770	0004469	0352	14737														
131		OBS	T0595	0377	34839	2770			14755														

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INCHES	MARDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER					
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT			
31	540	EV	4530 N	04813 W		149	58	05	21	151	1965	003	9377	1353	11	12	4	3		X4	X	9		0143		
						WATER		WIND		BARO- METER (mbs)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANSL (m)	DIR.	SPEED OF FORCE		DRY BULB	WET BULB														
															1	12										
MESSENGR TIME OF HR 1/10		CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH							
			STD	0000	0492	3386	2680		0012549		0000	14692														
151			OBS	0000	0492	33858	2680					14692														
			STD	0010	0479	3405	2697		0010979		0012	14690														
151			OBS	0015	0440	34077	2703					14675														
			STD	0020	0359	3402	2707		0010017		0022	14641														
151			OBS	0025	0295	33974	2709					14614														
			STD	0030	0306	3401	2711		0009624		0032	14620														
			STD	0050	0340	3414	2718		0008961		0051	14640														
151			OBS	0064	0351	34211	2723					14648														
			STD	0075	0326	3425	2728		0008022		0072	14639														
			STD	0100	0286	3433	2739		0007081		0091	14627														
			STD	0125	0267	3441	2747		0006330		0108	14624														
151			OBS	0133	0265	34434	2749					14625														
			STD	0150	0286	3450	2752		0005832		0123	14638														
151			OBS	0196	0330	34651	2760					14666														
			STD	0200	0332	3466	2761		0005088		0150	14668														
			STD	0250	0354	3472	2763		0004893		0175	14687														
151			OBS	T0294	0366	34763	2765					14699														
			STD	0300	0366	3477	2766		0004685		0199	14701														
151			OBS	0392	0371	34824	2770					14719														
			STD	0400	0372	3483	2770		0004383		0244	14720														
			STD	0500	0378	3486	2772		0004313		0288	14740														
151			OBS	0591	0380	34880	2773					14756														
			STD	0600	0380	3488	2773		0004276		0331	14758														
			STD	0700	0377	3488	2774		0004303		0374	14773														
151			OBS	0789	0375	34888	2774					14787														
			STD	0800	0375	3489	2774		0004339		0417	14789														
			STD	0900	0374	3489	2774		0004437		0461	14805														
			STD	1000	0371	3488	2774		0004510		0505	14820														
151			OBS	T1012	0370	34882	2774					14822														
			STD	1100	0364	3488	2775		0004527		0551	14834														
151			OBS	T1123	0362	34876	2775					14837														

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER									
CRUISE CODE	IO. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT								
31	540	EV	4530 N	04754 W		149	57	05	21	183	1965	003	9378	1460	12	16	4	2		X4	X	8	0144								
						WATER		WIND		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS															
						COLOR CODE		TRANS. (m)		DIR.		SPEED OR FORCE		BARO-METER (mb)		DRY BULB		WET BULB													
										16		522		105		089		089		1		10									
MESSNGR TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-2107		Σ Δ D DYN. M. X 10 <sup>3</sup>		SOUND VELOCITY		O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	Si O <sub>4</sub> -Si μg - dl/l	pH	S C										
		STD	0000	0490	3398	2690		0011642		0000		14692																			
183		OBS	0000	0490	33976	2690						14692																			
		STD	0010	0480	3398	2691		0011500		0012		14690																			
		STD	0020	0437	3399	2696		0011025		0023		14674																			
183		OBS	0021	0431	33988	2697						14671																			
		STD	0030	0341	3402	2709		0009859		0033		14635																			
183		OBS	0037	0288	34048	2716						14614																			
		STD	0050	0283	3408	2719		0008908		0052		14614																			
		STD	0075	0273	3420	2729		0007932		0073		14616																			
183		OBS	0079	0271	34222	2731						14616																			
		STD	0100	0311	3441	2743		0006699		0091		14639																			
		STD	0125	0352	3462	2755		0005520		0107		14664																			
183		OBS	0131	0361	34660	2758						14669																			
		STD	0150	0362	3468	2759		0005189		0120		14673																			
		STD	0200	0365	3473	2763		0004887		0145		14683																			
		STD	0250	0368	3478	2767		0004587		0169		14693																			
		STD	0300	0372	3482	2769		0004365		0191		14704																			
		STD	0400	0378	3487	2773		0004146		0234		14723																			
183		OBS	T0419	0379	34880	2773						14727																			
		STD	0500	0371	3488	2774		0004066		0275		14737																			
		STD	0600	0365	3489	2775		0004059		0316		14751																			
183		OBS	T0630	0363	34888	2776						14755																			
		STD	0700	0362	3489	2776		0004091		0356		14767																			
		STD	0800	0360	3489	2776		0004153		0398		14782																			
183		OBS	0843	0359	34893	2776						14789																			
		STD	0900	0357	3489	2777		0004177		0439		14798																			
		STD	1000	0354	3490	2777		0004203		0481		14814																			
183		OBS	T1078	0352	34899	2778						14826																			
		STD	1100	0353	3490	2777		0004263		0523		14830																			
183		OBS	T1152	0355	34896	2777						14839																			

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
CRUISE CODE	IO. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE		AMT			
31	540	EV	4530 N	04719 W	149	57	05	21	214	1965	003	9379	2195	12	14	4	2		X4	X	8	0145				
						WATER		WIND		BARO- METER (mb)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS										
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB															
								14	524	112	100	100	1	12												
MESSNGR TIME HR 1/10	CAS NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-2107		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	S C							
		STD	0000	0601	3392	2672		0013328		0000	14737															
214		OBS	0000	0601	33919	2672					14737															
		STD	0010	0613	3397	2674		0013103		0013	14744															
214		OBS	0016	0620	34014	2677					14748															
		STD	0020	0601	3407	2684		0012225		0026	14742															
		STD	0030	0557	3419	2699		0010820		0037	14728															
214		OBS	0037	0531	34254	2707					14719															
		STD	0050	0499	3428	2713		0009514		0058	14708															
		STD	0075	0450	3434	2723		0008563		0080	14693															
214		OBS	0077	0447	34349	2724					14692															
		STD	0100	0449	3447	2733		0007603		0101	14698															
		STD	0125	0451	3457	2741		0006903		0119	14705															
		STD	0150	0453	3466	2748		0006278		0135	14711															
		STD	0200	0458	3476	2755		0005631		0165	14722															
214		OBS	0203	0458	34761	2756					14723															
		STD	0250	0379	3475	2763		0004958		0191	14697															
214		OBS	0280	0378	34734	2762					14702															
		STD	0300	0420	3482	2764		0004875		0216	14724															
214		OBS	0330	0460	34907	2767					14747															
		STD	0400	0432	3491	2770		0004467		0263	14747															
214		OBS	T0407	0430	34906	2770					14747															
		STD	0500	0425	3491	2771		0004461		0307	14760															
		STD	0600	0416	3491	2772		0004458		0352	14773															
214		OBS	0612	0415	34913	2772					14775															
		STD	0700	0399	3492	2775		0004285		0396	14783															
		STD	0800	0384	3492	2776		0004205		0438	14793															
214		OBS	0815	0382	34922	2776					14795															
		STD	0900	0371	3492	2777		0004143		0480	14804															
		STD	1000	0362	3491	2778		0004197		0522	14817															
214		OBS	T1042	0360	34909	2778					14823															
		STD	1100	0359	3491	2777		0004275		0564	14832															
214		OBS	T1153	0359	34904	2777					14841															

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC OR	MARSSEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOCC STATION NUMBER
CTRY CODE	IO. NO.					10"	1"	MO	DAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4532 N	04635 W		149	56 05	22	015	1965	003	9380	2963	12	XX	0	0		X4	X	8		0146

WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		19	S08	119	083	083	1	10	

MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C
		STD	0000	0672	3398	2668	0013734	0000	14766								
015		OBS	0000	0672	33982	2668			14766								
		STD	0010	0589	3403	2682	0012368	0013	14735								
		STD	0020	0523	3406	2693	0011395	0025	14710								
015		OBS	0025	0497	34076	2697			14701								
		STD	0030	0494	3408	2698	0010937	0036	14700								
		STD	0050	0483	3408	2699	0010839	0058	14699								
015		OBS	0073	0471	34100	2702			14698								
		STD	0075	0470	3411	2703	0010501	0085	14698								
		STD	0100	0459	3420	2711	0009737	0110	14699								
		STD	0125	0448	3428	2718	0009046	0133	14700								
		STD	0150	0438	3436	2726	0008357	0155	14700								
015		STD	0200	0416	3450	2739	0007128	0194	14701								
		OBS	0202	0415	34509	2740			14702								
		STD	0250	0436	3464	2748	0006340	0227	14720								
		STD	0300	0457	3473	2753	0005956	0258	14738								
015		OBS	T0302	0458	34736	2754			14739								
		STD	0400	0436	3482	2762	0005191	0314	14747								
015		OBS	0403	0435	34817	2762			14747								
		STD	0500	0394	3485	2769	0004562	0363	14746								
		STD	0600	0364	3487	2774	0004175	0406	14751								
015		OBS	T0604	0363	34873	2774			14751								
		STD	0700	0352	3489	2777	0003977	0447	14763								
		STD	0800	0341	3491	2779	0003803	0486	14775								
015		OBS	0803	0341	34910	2780			14775								
		STD	0900	0338	3492	2781	0003765	0524	14790								
		STD	1000	0336	3492	2781	0003822	0562	14806								
015		OBS	T1027	0335	34925	2781			14810								
		STD	1100	0333	3493	2782	0003791	0600	14822								
		STD	1200	0331	3494	2783	0003801	0638	14838								
015		OBS	T1216	0331	34937	2783			14840								

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	IO. NO.					10"	1"	MO	OAY	HR./1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER		SEA	TYPE	
31	540	EV	4536 N	04604 W		149	56	05	22	048	1965	003	9381	3383	12	24	3	3	X4	X9		0142

WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		23	S14	115	083	078	1	13	

MESSNGR TIME HR 1/10	CST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C
		STD	0000	0736	3391	2653	0015145	0000	14790								
048		OBS	0000	0736	33905	2653			14790								
		STD	0010	0688	3400	2667	0013820	0014	14774								
		STD	0020	0660	3409	2678	0012804	0028	14766								
048		OBS	0025	0654	34131	2682			14765								
		STD	0030	0667	3416	2682	0012386	0040	14771								
		STD	0050	0700	3428	2688	0011928	0065	14789								
048		OBS	0050	0700	34283	2688			14789								
		STD	0075	0663	3430	2694	0011358	0094	14779								
		STD	0100	0626	3446	2711	0009732	0120	14771								
048		OBS	0111	0610	34580	2723			14768								
		STD	0125	0672	3477	2730	0008041	0142	14797								
048		OBS	0125	0672	34771	2730			14797								
		STD	0150	0584	3473	2738	0007286	0162	14765								
048		OBS	0150	0584	34727	2738			14765								
		STD	0200	0427	3456	2743	0006826	0197	14707								
048		OBS	0200	0427	34556	2743			14707								
		STD	0250	0418	3474	2758	0005387	0227	14714								
048		OBS	0250	0418	34742	2758			14714								
		STD	0300	0444	3483	2763	0005063	0253	14734								
048		OBS	T0311	0448	34849	2764			14738								
		STD	0400	0429	3487	2767	0004725	0302	14745								
		STD	0500	0408	3489	2771	0004437	0348	14753								
		STD	0600	0386	3491	2775	0004144	0391	14761								
048		OBS	0601	0386	34907	2775			14761								
		STD	0700	0385	3493	2777	0004046	0432	14777								
048		OBS	0796	0383	34933	2777			14792								
		STD	0800	0382	3493	2777	0004086	0473	14792								
		STD	0900	0367	3492	2778	0004097	0514	14803								
		STD	1000	0358	3491	2778	0004173	0555	14815								
048		OBS	1021	0357	34904	2778			14818								
		STD	1100	0358	3491	2778	0004232	0597	14832								
		STD	1200	0359	3492	2779	0004255	0639	14849								
048		OBS	T1200	0359	34920	2779			14849								

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR./1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4510 N	04548 W		149	55	05	22	084	1965	003	9382	3566	12	25	3	3		X2	6	8	0148
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB												
									24	508	132	083	078	7	11								
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?		Σ Δ θ DYN. M. x 10 <sup>3</sup>		SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>3</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH					
		STD	0000	1310	3541	2671	0013451		0000		15017												
084		OBS	0000	1310	35408	2671					15017												
		STD	0010	1352	3562	2678	0012743		0013		15035												
		STD	0020	1380	3577	2684	0012228		0026		15048												
084		OBS	0026	1390	35833	2687					15053												
		STD	0030	1386	3583	2688	0011938		0038		15052												
		STD	0050	1365	3579	2689	0011869		0061		15048												
084		OBS	0062	1351	35771	2690					15045												
		STD	0075	1331	3573	2692	0011679		0091		15041												
		STD	0100	1293	3566	2694	0011521		0120		15031												
		STD	0125	1254	3559	2696	0011373		0149		15021												
		STD	0150	1216	3552	2698	0011244		0177		15011												
084		OBS	0155	1208	35506	2698					15009												
084		OBS	0186	1279	35718	2701					15041												
		STD	0200	1226	3561	2703	0010908		0232		15024												
		STD	0250	1059	3530	2710	0010286		0285		14970												
084		OBS	T0285	0961	35150	2715					14938												
		STD	0300	0931	3514	2720	0009429		0334		14930												
		STD	0400	0759	3506	2740	0007558		0419		14880												
084		OBS	T0414	0739	35053	2743					14874												
		STD	0500	0643	3504	2755	0006224		0488		14851												
		STD	0600	0556	3503	2765	0005316		0546		14832												
084		OBS	0621	0541	35022	2766					14830												
		STD	0700	0507	3502	2770	0004849		0597		14829												
		STD	0800	0468	3501	2774	0004547		0644		14829												
084		OBS	0828	0458	35005	2775					14830												
		STD	0900	0433	3498	2776	0004441		0689		14831												
		STD	1000	0405	3495	2776	0004417		0733		14836												
084		OBS	T1056	0393	34943	2777					14840												
		STD	1100	0385	3494	2778	0004338		0777		14844												
		STD	1200	0374	3493	2778	0004365		0820		14856												
084		OBS	T1241	0372	34924	2778					14862												

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARS SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT	
31	540	EV	4442 N	04600 W		149	46	05	22	118	1965	003	9383	3658	11	24	3	2		X2	6	8		0149
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB													
										24	509	152	083	072	7	12								
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ θ DYN. M. x 10 <sup>3</sup>		SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>3</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH						
		STD	0000	1005	3445	2653	0015126		0000		14899													
118		OBS	0000	1005	34445	2653					14899													
		STD	0010	1073	3463	2656	0014909		0015		14927													
118		OBS	0015	1107	34727	2657					14941													
		STD	0020	1041	3484	2678	0012844		0029		14920													
118		OBS	0024	0995	34919	2692					14905													
		STD	0030	0994	3493	2692	0011467		0041		14906													
		STD	0050	0991	3495	2694	0011316		0064		14908													
		STD	0075	0988	3497	2697	0011120		0092		14911													
118		OBS	0080	0987	34976	2697					14912													
		STD	0100	0925	3493	2704	0010450		0119		14892													
		STD	0125	0858	3488	2711	0009875		0144		14870													
		STD	0150	0803	3482	2715	0009506		0168		14853													
		STD	0200	0731	3472	2717	0009375		0216		14832													
118		OBS	0209	0723	34695	2717					14830													
		STD	0250	0724	3486	2730	0008278		0260		14839													
118		OBS	0291	0724	34904	2733					14846													
		STD	0300	0686	3485	2734	0007914		0300		14832													
118		OBS	0349	0575	34759	2742					14795													
118		OBS	T0384	0592	34903	2751					14809													
		STD	0400	0589	3492	2752	0006258		0371		14811													
		STD	0500	0573	3501	2762	0005509		0430		14822													
118		OBS	0580	0559	35036	2765					14830													
		STD	0600	0541	3502	2766	0005159		0483		14826													
		STD	0700	0468	3498	2772	0004660		0532		14812													
118		OBS	0778	0430	34962	2775					14809													
		STD	0800	0426	3496	2775	0004381		0578		14811													
		STD	0900	0415	3497	2777	0004310		0621		14823													
118		OBS	T0996	0411	34973	2777					14838													
		STD	1000	0411	3497	2778	0004315		0664		14838													
118		OBS	T1058	0412	34994	2779					14849													



REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO DAY HR.1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

31	540	EV	4410 N	04603 W	149	46	05	22	156	1965	003	9384	3931	12	04	3	2	X2	6	8	0150
						WATER		WIND		BARO- METER		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS					
						COLOR CODE	TRANS. IMT	DIR.	SPEED OR FORCE	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS								
									22	S08	156	106	089	8	11						

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma_t$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S
		STD	0000	1040	3474	2670	0013521	0000	14915								
156		OBS	0000	1040	34740	2670			14915								
		STD	0010	0992	3478	2681	0012460	0013	14900								
		STD	0020	0958	3482	2690	0011641	0025	14890								
		STD	0030	0938	3486	2697	0011050	0036	14884								
156		OBS	0032	0936	34870	2698			14884								
		STD	0050	0982	3498	2699	0010906	0058	14905								
156		OBS	0073	1010	35084	2702			14921								
		STD	0075	1000	3507	2703	0010590	0085	14917								
		STD	0100	0884	3497	2714	0009540	0110	14877								
		STD	0125	0790	3489	2722	0008783	0133	14845								
		STD	0150	0718	3484	2729	0008185	0154	14820								
156		OBS	0185	0655	34828	2737			14801								
		STD	0200	0655	3487	2740	0007195	0193	14804								
		STD	0250	0655	3496	2747	0006602	0227	14813								
156		OBS	0253	0655	34966	2747			14814								
156		OBS	T0291	0621	34980	2753			14807								
		STD	0300	0612	3498	2754	0005964	0259	14805								
		STD	0400	0535	3498	2764	0005113	0314	14790								
156		OBS	0422	0522	34982	2766			14788								
		STD	0500	0507	3500	2769	0004773	0364	14795								
		STD	0600	0486	3502	2773	0004478	0410	14804								
156		OBS	T0633	0478	35026	2774			14806								
		STD	0700	0456	3501	2775	0004291	0454	14808								
		STD	0800	0429	3499	2777	0004217	0496	14813								
156		OBS	T0842	0420	34981	2777			14816								
		STD	0900	0411	3498	2778	0004173	0538	14822								
		STD	1000	0398	3497	2779	0004184	0580	14833								
156		OBS	1070	0390	34964	2779			14841								
		STD	1100	0387	3496	2779	0004215	0622	14845								
156		OBS	T1183	0380	34956	2779			14856								

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	MARS SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO DAY HR.1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT	

31	540	EV	4410 N	04636 W	149	46	05	22	185	1965	003	9385	3931	12	23	3	2	X2	6	8	0151
						WATER		WIND		BARO- METER		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS					
						COLOR CODE	TRANS. IMT	DIR.	SPEED OR FORCE	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS								
									23	S10	159	083	072	8	09						

MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S %	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma_t$ OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S
		STD	0000	0799	3391	2644	0015995	0000	14815								
185		OBS	0000	0799	33907	2644			14815								
		STD	0010	0908	3442	2667	0013803	0015	14864								
		STD	0020	0999	3485	2686	0012056	0028	14905								
185		OBS	0020	0999	34853	2686			14905								
		STD	0030	0993	3488	2689	0011789	0040	14905								
		STD	0050	0981	3493	2695	0011251	0063	14904								
		STD	0075	0967	3500	2703	0010580	0090	14904								
		STD	0100	0952	3506	2710	0009910	0116	14904								
185		OBS	0122	0939	35122	2717			14903								
		STD	0125	0925	3510	2718	0009267	0140	14898								
		STD	0150	0819	3498	2725	0008584	0162	14861								
185		OBS	0189	0684	34823	2732			14813								
		STD	0200	0681	3484	2734	0007801	0203	14814								
		STD	0250	0666	3489	2740	0007254	0241	14817								
		STD	0300	0648	3495	2747	0006674	0275	14819								
		STD	0400	0600	3506	2762	0005350	0336	14817								
185		OBS	T0408	0596	35070	2763			14817								
		STD	0500	0520	3502	2769	0004770	0386	14801								
		STD	0600	0460	3498	2773	0004453	0432	14792								
185		OBS	T0612	0454	34976	2773			14792								
		STD	0700	0431	3496	2774	0004362	0476	14797								
		STD	0800	0411	3495	2776	0004299	0520	14805								
185		OBS	0816	0408	34949	2776			14806								
		STD	0900	0401	3495	2777	0004275	0562	14817								
		STD	1000	0392	3495	2778	0004259	0605	14830								
185		OBS	T1041	0389	34952	2778			14836								
		STD	1100	0384	3495	2778	0004252	0648	14843								
185		OBS	T1184	0377	34939	2778			14854								

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.		1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT PER	SEA		TYPE	AMT	
31	540	EV	4416 N	04716 W		149	47	05	22	218	1965	003	9386	4023	11	21	5	4		X2	6	8	0152
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB											
									20	S14	146	083	078	8	08								
MESSAGE# TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si O <sub>4</sub> -Si μg - at/l	pH	S CC				
218		STD	0000	1062	3495	2682		0012361		0000	14926												
		OBS	0000	1062	34947	2682					14926												
		STD	0010	1063	3499	2685		0012083		0012	14928												
		STD	0020	1063	3502	2688		0011885		0024	14930												
		STD	0030	1064	3506	2691		0011630		0036	14933												
		STD	0050	1065	3513	2696		0011177		0059	14937												
		STD	0075	1066	3520	2701		0010737		0086	14943												
218		STD	0100	1068	3527	2706		0010314		0112	14948												
		STD	0125	1069	3532	2710		0010021		0138	14953												
		STD	0150	1071	3537	2713		0009746		0163	14959												
		OBS	0171	1072	35399	2716					14963												
		STD	0200	1074	3540	2715		0009681		0211	14968												
		STD	0250	1077	3541	2715		0009821		0260	14978												
		STD	0300	1081	3541	2715		0009961		0309	14987												
218		OBS	T0317	1082	35414	2715					14991												
218		OBS	0353	1046	35314	2714					14982												
218		STD	0400	0889	3520	2731		0008515		0402	14931												
		STD	0500	0633	3503	2755		0006162		0475	14847												
		OBS	0545	0553	34979	2762					14821												
		STD	0600	0524	3498	2765		0005262		0532	14819												
		STD	0700	0477	3497	2770		0004822		0583	14816												
		OBS	T0745	0458	34971	2772					14815												
		STD	0800	0435	3496	2774		0004512		0629	14815												
218		STD	0900	0404	3494	2776		0004385		0674	14818												
		OBS	0957	0392	34932	2776					14823												
		STD	1000	0386	3493	2777		0004320		0717	14827												
		OBS	T1099	0380	34931	2777					14841												

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDIC	MARSDEN SQUARE		STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.	1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT PER	SEA	TYPE		AMT		
31	540	EV	4423 N	04758 W	149	47	05	23	013	1965	003	9387	3621	13	24	4	4		X8	7	8	0153		
						WATER		WIND		AIR TEMP. °C		VIS		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mb)	DRY BULB	WET BULB												
								20	S10	139	050	044	7	10										
MESSAGE# TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S CC							
013		STD	0000	0760	3377	2639	0016460	0000	14798															
		OBS	0000	0760	33772	2639			14798															
		STD	0010	0996	3460	2667	0013856	0015	14899															
013		STD	0020	1186	3527	2684	0012200	0028	14977															
		OBS	0028	1303	35702	2695			15023															
		STD	0030	1293	3568	2695	0011212	0040	15020															
013		STD	0050	1203	3552	2701	0010750	0062	14991															
		STD	0075	1109	3535	2705	0010376	0088	14960															
		OBS	0098	1042	35240	2709			14938															
013		STD	0100	1041	3524	2709	0010075	0114	14938															
		STD	0125	1029	3524	2711	0009952	0139	14938															
		STD	0150	1017	3523	2712	0009827	0164	14938															
013		STD	0200	0993	3523	2716	0009579	0212	14937															
		OBS	0218	0984	35226	2717			14937															
		STD	0250	0867	3510	2727	0008612	0258	14897															
013		STD	0300	0726	3496	2737	0007654	0298	14849															
		OBS	T0327	0670	34922	2742			14831															
		STD	0400	0615	3498	2754	0006147	0367	14822															
013		OBS	0435	0591	35000	2759			14819															
		STD	0500	0552	3500	2763	0005312	0425	14814															
		STD	0600	0498	3500	2770	0004744	0475	14808															
013		OBS	0651	0474	35004	2773			14807															
		STD	0700	0452	3499	2774	0004391	0521	14806															
		STD	0800	0415	3496	2776	0004272	0564	14807															
013		OBS	T0868	0397	34943	2777			14810															
		STD	0900	0394	3494	2777	0004251	0606	14814															
		STD	1000	0384	3494	2778	0004252	0649	14827															
013		STD	1100	0377	3493	2778	0004285	0692	14840															
		OBS	T1108	0376	34934	2778			14841															
		STD	1200	0371	3493	2778	0004305	0735	14854															
013		STD	1300	0366	3493	2779	0004336	0778	14869															
		OBS	1306	0366	34932	2779			14870															

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT DIRECTION	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT PER	SEA		TYPE	AMT	
						COLOR CODE	TRANS. IMI	WIND DIR.	SPEED OR FORCE	BARO- METER (mb)												
31	540	EV	4430 N	04836 W		149	48	05	23	056	1965	003	9388	2743	12	21	1	2		X2	X 8	0154

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT DIRECTION	MARS DEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLING	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR. 1/10	CRUISE NO.			STATION NUMBER	DIR.	HGT	PER		SEA	TYPE		AMT
31	540	EV	4431 N	04850 W		149	48	05	23	076	1965	003	9389	1390	12	20	2	2		X2	6 8		0155
						WATER		WIND		BARO- METER (mb)		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
COLOR CODE		TRANS. (m)	DIR.	SPEED OF FORCE			DRY BULB	WET BULB															
							23	503	112	033	028	6	11										
MESSNGR TIME HR. 1/10	CST OF ND.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta D$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - dl/l$	TOTAL-P $\mu g - dl/l$	NO <sub>3</sub> -N $\mu g - dl/l$	NO <sub>3</sub> -N $\mu g - dl/l$	SiO <sub>4</sub> -Si $\mu g - dl/l$	pH	S C C					
		STD	0000	0196	3290	2631	0017187		0000	14552													
		OBS	0000	0196	32895	2631				14552													
		STD	0010	0195	3290	2631	0017177		0017	14553													
076		OBS	0015	0195	32897	2632				14554													
		STD	0020	0052	3303	2651	0015284		0033	14493													
076		OBS	0025	-0049	33141	2665				14449													
		STD	0030	-0034	3319	2668	0013658		0048	14457													
076		OBS	0048	0017	33366	2680				14486													
		STD	0050	0022	3339	2682	0012381		0074	14489													
		STD	0075	0085	3366	2700	0010669		0103	14525													
		STD	0100	0139	3389	2715	0009270		0128	14557													
076		OBS	0120	0174	34046	2725				14578													
		STD	0125	0179	3407	2727	0008197		0149	14581													
		STD	0150	0203	3417	2733	0007632		0169	14597													
		STD	0200	0246	3435	2744	0006646		0205	14627													
076		OBS	0214	0257	34398	2746				14635													
		STD	0250	0285	3450	2752	0005889		0236	14654													
		STD	0300	0319	3462	2759	0005340		0264	14678													
		STD	0400	0365	3478	2767	0004684		0315	14717													
076		OBS	T0426	0373	34813	2769				14725													
		STD	0500	0378	3484	2770	0004462		0360	14740													
076		OBS	0576	0381	34862	2772				14754													
		STD	0600	0381	3486	2772	0004405		0405	14758													
		STD	0700	0380	3487	2773	0004423		0449	14774													
076		OBS	T0769	0380	34879	2773				14786													
		STD	0800	0380	3488	2773	0004454		0493	14791													
		STD	0900	0379	3489	2774	0004463		0538	14807													
076		OBS	0982	0379	34891	2774				14821													
		STD	1000	0378	3489	2774	0004520		0583	14823													
		STD	1100	0374	3490	2775	0004529		0628	14839													
076		OBS	T1157	0370	34898	2776				14846													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT DIRECTION	MARS SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	IO. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4435 N	04905 W		149	49	05	23	092	1965	003	9390	0141	01	25	2	2		X2	6	8	0156
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mbs)	DRY BULB	WET BULB											
								27	S11	105	033	028	8	03									
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T		SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH	NODC STATION NUMBER				
092		STD	0000	0201	3291	2632		0017108		0000	14554												
		OBS	0000	0201	32910	2632					14554												
		STD	0010	0129	3296	2641		0016255		0017	14525												
		STD	0020	0068	3300	2648		0015597		0033	14499												
092		OBS	0027	0032	33029	2652					14485												
		STD	0030	0031	3304	2653		0015097		0048	14485												
		STD	0050	0022	3312	2660		0014439		0077	14485												
		STD	0075	0011	3320	2667		0013769		0113	14485												
092		STD	0100	-0000	3326	2672		0013252		0147	14485												
		OBS	0106	-0003	33274	2674					14485												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT DIRECTION	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	IO. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4437 N	04919 W		149	49	05	23	103	1965	003	9391	0064	01	27	3	4		X2	6	8	0157
						WATER		WIND		AIR TEMP. °C				NO. OBS. DEPTHS		SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mbs)	DRY BULB	WET BULB	VIS. CODE										
									26	S10	105	033	028	8	05								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ σ DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	NO <sub>2</sub> -N μg - dl/l	NO <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	NODC STATION NUMBER						
		STD	0000	0233	3304	2640	0016339	0000	14570														
103		OBS	0000	0233	33042	2640			14570														
103		OBS	0007	0231	33048	2641			14571														
		STD	0010	0206	3304	2642	0016160	0016	14560														
103		OBS	0018	0146	33028	2645			14535														
		STD	0020	0133	3303	2646	0015748	0032	14529														
		STD	0030	0079	3304	2651	0015360	0048	14507														
		STD	0050	0029	3306	2655	0014947	0078	14487														
103		OBS	0056	0028	33064	2655			14488														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT DIRECTION	MARS SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER						
CTRY CODE	IO. NO.					10"	1"	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT							
31	540	EV	4400 N	04918 W	149	49	05	23	137	1965	003	9392	0044	00	26	3	4		X2	6	8	0158							
						WATER		WIND		AIR TEMP. °C																			
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mbs)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS														
						20										S08	105	067	056	8	04								
MESSNGR TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta \sigma$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{dl/l}$	TOTAL-P $\mu\text{g} - \text{dl/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{dl/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{dl/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{dl/l}$	pH	NODC STATION NUMBER												
		STD	0000	0299	3305	2635	0016821	0000	14599																				
137		OBS	0000	0299	33047	2635			14599																				
		STD	0010	0242	3305	2640	0016350	0017	14576																				
137		OBS	0015	0212	33055	2643			14564																				
		STD	0020	0173	3306	2646	0015803	0033	14547																				
137		OBS	0025	0149	33058	2648			14538																				
		STD	0030	0147	3306	2648	0015607	0048	14537																				
137		OBS	0035	0144	33061	2648			14537																				



REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT NODE	MARDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.						10"	1"	MO		DAY	HR./1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE
31	540	EV	4355 N	04907 W	149	39	05	23	151	1965	003	9393	0183	02	21	4	3		X2	7	8	0159	
						WATER		WIND		AIR TEMP. °C													
						COLOR CODE	TRANS. INT	DIR.	SPEED OR FORCE	BARO- METER (mbars)	DRY BULB	WET BULB	VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
									18	516	088	050	044	8	05								

MESSENGER TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - \text{at/l}$	TOTAL-P $\mu g - \text{at/l}$	NO <sub>2</sub> -N $\mu g - \text{at/l}$	NO <sub>3</sub> -N $\mu g - \text{at/l}$	SiO <sub>4</sub> -Si $\mu g - \text{at/l}$	pH	S °C
151		STD	0000	0199	3297	2637	0016662	0000	14554								
		OBS	0000	0199	32967	2637			14554								
		STD	0010	0088	3307	2652	0015175	0016	14508								
		STD	0020	0002	3316	2665	0014024	0031	14472								
151		OBS	0020	0002	33163	2665			14472								
		STD	0030	0003	3319	2667	0013819	0044	14474								
		STD	0050	0004	3325	2671	0013362	0072	14479								
		STD	0075	0006	3336	2680	0012524	0104	14485								
151		OBS	0081	0006	33390	2683			14487								
		STD	0100	0045	3357	2695	0011124	0134	14510								
		STD	0125	0089	3376	2708	0009936	0160	14537								
		STD	0150	0124	3391	2718	0009026	0184	14559								
151		OBS	0152	0127	33917	2718			14560								
151		OBS	0179	0156	34022	2724			14579								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT NODE	MARDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. NO.						10"	1"	MO		DAY	HR./1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE
31	540	EV	4348 N	04856 W	149	38	05	23	165	1965	003	9394	0887	08	18	3	3		X8	7	8		0160
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	METER (mbars)	DRY BULB	WET BULB											
									18	512	081	050	044	7	07								

MESSENGER TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ D DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - \text{at/l}$	TOTAL-P $\mu g - \text{at/l}$	NO <sub>2</sub> -N $\mu g - \text{at/l}$	NO <sub>3</sub> -N $\mu g - \text{at/l}$	SiO <sub>4</sub> -Si $\mu g - \text{at/l}$	pH	S °C
165		STD	0000	0184	3293	2635	0016831	0000	14547								
		OBS	0000	0184	32931	2635			14547								
		STD	0010	0183	3313	2651	0015315	0016	14551								
		STD	0020	0182	3332	2666	0013867	0031	14555								
165		STD	0030	0180	3348	2679	0012647	0044	14558								
		OBS	0049	0178	33734	2700			14564								
		STD	0050	0177	3374	2700	0010658	0067	14563								
		STD	0075	0159	3396	2719	0008871	0092	14563								
165		OBS	0079	0158	33988	2721			14563								
		STD	0100	0196	3413	2730	0007861	0113	14585								
		STD	0125	0238	3429	2739	0006993	0131	14610								
		STD	0150	0274	3443	2748	0006254	0148	14632								
165		STD	0200	0332	3465	2760	0005163	0176	14668								
		OBS	0209	0340	34678	2761			14673								
		STD	0250	0350	3472	2764	0004853	0201	14685								
		STD	0300	0360	3477	2767	0004621	0225	14698								
165		OBS	T0384	0373	34827	2770			14718								
		STD	0400	0374	3483	2770	0004405	0270	14721								
		STD	0500	0378	3486	2772	0004313	0314	14740								
		OBS	T0567	0380	34877	2773			14752								
165		STD	0600	0380	3488	2773	0004291	0357	14758								
		STD	0700	0380	3488	2773	0004351	0400	14774								
165		OBS	T0764	0379	34884	2774			14784								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DR.	HGT	PER	SEA		TYPE	AMT	

WATER		WIND		BARO- METER (mbs)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB			
		16	516	061	061	050	5	11	

MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C
		STD	0000	0408	3362	2670	0013487	0000	14653								
179		OBS	0000	0408	33619	2670			14653								
		STD	0010	0407	3363	2671	0013407	0013	14655								
179		OBS	0015	0406	33634	2672			14655								
		STD	0020	0362	3376	2686	0012004	0026	14639								
179		OBS	0029	0298	33945	2707			14616								
		STD	0030	0297	3395	2707	0009999	0037	14615								
		STD	0050	0277	3405	2717	0009087	0056	14611								
179		OBS	0073	0268	34166	2727			14613								
		STD	0075	0270	3418	2728	0008061	0078	14614								
		STD	0100	0298	3436	2740	0006960	0096	14633								
		STD	0125	0321	3451	2750	0006056	0113	14649								
179		OBS	0144	0337	34607	2756			14660								
		STD	0150	0340	3462	2757	0005425	0127	14663								
		STD	0200	0360	3471	2762	0004985	0153	14681								
		STD	0250	0375	3478	2766	0004654	0177	14696								
179		OBS	T0290	0384	34824	2768			14707								
		STD	0300	0385	3483	2769	0004425	0200	14709								
		STD	0400	0390	3487	2771	0004278	0243	14729								
179		OBS	0414	0391	34875	2772			14731								
		STD	0500	0382	3488	2773	0004207	0286	14742								
179		OBS	T0586	0376	34889	2774			14754								
		STD	0600	0376	3489	2775	0004158	0328	14756								
		STD	0700	0373	3490	2776	0004139	0369	14771								
179		OBS	0785	0370	34906	2776			14784								
		STD	0800	0369	3491	2776	0004140	0411	14787								
		STD	0900	0365	3491	2777	0004174	0452	14801								
		STD	1000	0360	3491	2777	0004205	0494	14816								
179		OBS	T1003	0360	34906	2777			14817								
		STD	1100	0359	3491	2778	0004245	0536	14832								
179		OBS	T1101	0359	34910	2778			14833								

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDIC	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DR.	HGT	PER	SEA		TYPE	AMT	

31 540 EV 4330 N 04806 W 149 38 05 23 213 1965 003 9396										32 92 11 24 4 3 0162									
WATER		WIND		BARO-		AIR TEMP. °C		VIS.		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS							
COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	METER (mbars)	DRY BULB	WET BULB	VIS. CODE												
		26	521	037	067	067	6	12											

MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub> ?	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	NO <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	SiO <sub>4</sub> -Si μg - at/l	pH	S C
		STD	0000	0609	3332	2624	0017883	0000	14732								
213		OBS	0000	0609	33323	2624			14732								
		STD	0010	0606	3332	2624	0017856	0018	14733								
213		OBS	0015	0605	33325	2625			14733								
		STD	0020	0468	3336	2643	0016055	0035	14678								
213		OBS	0026	0329	33401	2661			14621								
		STD	0030	0344	3351	2668	0013729	0050	14630								
		STD	0050	0417	3397	2697	0010980	0074	14670								
		STD	0075	0509	3434	2716	0009206	0100	14717								
213		OBS	0091	0568	34463	2719			14746								
		STD	0100	0507	3445	2725	0008424	0122	14722								
		STD	0125	0394	3439	2733	0007637	0142	14678								
213		OBS	0131	0380	34381	2734			14673								
		STD	0150	0425	3449	2738	0007250	0160	14697								
213		OBS	0187	0484	34665	2745			14730								
		STD	0200	0479	3468	2747	0006466	0195	14730								
		STD	0250	0467	3475	2754	0005863	0225	14734								
213		OBS	T0279	0465	34791	2757			14739								
		STD	0300	0471	3482	2759	0005418	0254	14745								
		STD	0400	0499	3498	2768	0004730	0304	14775								
213		OBS	0403	0500	34980	2768			14776								
		STD	0500	0453	3496	2772	0004411	0350	14773								
		STD	0600	0417	3494	2774	0004247	0393	14774								
213		OBS	0600	0417	34940	2774			14774								
		STD	0700	0399	3493	2775	0004211	0436	14783								
213		OBS	0794	0387	34920	2776			14793								
		STD	0800	0387	3492	2776	0004240	0478	14794								
		STD	0900	0382	3492	2776	0004264	0520	14809								
		STD	1000	0375	3492	2777	0004262	0563	14823								
213		OBS	T1013	0374	34922	2777			14824								
		STD	1100	0367	3492	2778	0004268	0606	14836								
213		OBS	T1118	0365	34918	2778			14838								

REFERENCE		SHIP CODE	LATITUDE " 1/10	LONGITUDE " 1/10	DATE MO DAY	MARSEN SQUARE	STATION TIME (GMT)	YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER	
CTRY CODE	IO. NO.								CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT		
31	540	EV	4316 N	04731 W	149	37 05 24	006 1965	003	9397		3584	13	25	6	3		X2	7	8		0163
					WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS				
					COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	DRY BULB	WET BULB											
								26	530	061	067	061	7	10							
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ D OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C				
006		STD	0000	0878	3416	2651	0015282	0000	14848												
		OBS	0000	0878	34157	2651			14848												
		STD	0010	0863	3418	2655	0014944	0015	14844												
		STD	0020	0848	3419	2659	0014608	0030	14840												
006		STD	0030	0833	3421	2662	0014281	0044	14836												
		OBS	0032	0830	34214	2663			14836												
		STD	0050	0923	3462	2680	0012633	0071	14879												
		STD	0075	1024	3508	2699	0010913	0101	14926												
006		OBS	0080	1041	35157	2702			14934												
		STD	0100	1024	3515	2704	0010480	0127	14931												
		STD	0125	1003	3513	2707	0010284	0153	14927												
		STD	0150	0983	3512	2710	0010090	0179	14924												
006		STD	0200	0941	3510	2715	0009708	0228	14916												
		OBS	0239	0908	35075	2718			14910												
		STD	0250	0873	3505	2722	0009074	0275	14899												
		OBS	T0290	0766	34982	2733			14864												
006		STD	0300	0757	3499	2735	0007874	0318	14862												
		STD	0400	0673	3503	2750	0006558	0390	14846												
		OBS	0426	0652	35038	2754			14842												
		STD	0500	0579	3501	2761	0005593	0451	14825												
006		STD	0600	0505	3499	2768	0004927	0503	14811												
		OBS	0639	0483	34983	2770			14808												
		STD	0700	0471	3499	2772	0004622	0551	14814												
		STD	0800	0451	3499	2774	0004485	0596	14822												
006		OBS	T0855	0440	34993	2776			14827												
		STD	0900	0431	3499	2777	0004343	0641	14830												
		STD	1000	0412	3497	2777	0004355	0684	14839												
		OBS	1085	0397	34961	2778			14847												
006		STD	1100	0394	3496	2778	0004301	0727	14848												
		STD	1200	0378	3494	2778	0004340	0771	14857												
		OBS	T1274	0366	34926	2778			14865												

REFERENCE		SHIP CODE	LATITUDE ° '"/10	LONGITUDE ° '"/10	DATE MO DAY	YEAR	MARSEN SQUARE		STATION TIME IGMT		ORIGINATOR'S CRUISE NO.	STATION NUMBER	DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NOOC STATION NUMBER
CTRY CODE	ID. NO.						10"	1"	MO	OAY					HR.1/10	10"	1"		DIR.	HGT	
31	540	EV	4304 N	04704 W	149	37 05 24	034	1965	003	9398	3749	12	26	5	2		X2	7	8	0164	
				WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS									
				COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mba)	DRY BULB	WET BULB	VIS. CODE										
							27	523	071	083	072	4	10								
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$	$\Sigma \Delta$ D OYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu\text{g} - \text{at/l}$	TOTAL-P $\mu\text{g} - \text{at/l}$	NO <sub>2</sub> -N $\mu\text{g} - \text{at/l}$	NO <sub>3</sub> -N $\mu\text{g} - \text{at/l}$	SiO <sub>4</sub> -Si $\mu\text{g} - \text{at/l}$	pH	S C				
		STD	0000	1088	3497	2679	0012633	0000	14935												
034		OBS	0000	1088	34970	2679			14935												
		STD	0010	1088	3498	2680	0012590	0013	14937												
		STD	0020	1089	3498	2680	0012620	0025	14939												
034		OBS	0024	1089	34985	2680			14940												
		STD	0030	1075	3499	2683	0012334	0038	14936												
		STD	0050	1035	3502	2693	0011483	0062	14925												
		STD	0075	0999	3506	2702	0010647	0089	14917												
		STD	0100	0978	3509	2708	0010137	0115	14913												
034		OBS	0101	0977	35091	2708			14913												
		STD	0125	0976	3512	2711	0009934	0140	14917												
034		OBS	0140	0975	35137	2712			14919												
		STD	0150	0981	3517	2714	0009698	0165	14924												
		STD	0200	1009	3526	2716	0009607	0213	14943												
034		OBS	0233	1027	35279	2714			14955												
		STD	0250	0980	3523	2718	0009463	0261	14941												
		STD	0300	0854	3510	2729	0008508	0306	14900												
034		OBS	T0377	0699	34963	2741			14852												
		STD	0400	0672	3497	2745	0006988	0383	14845												
		STD	0500	0571	3499	2760	0005637	0446	14821												
034		OBS	T0571	0519	34995	2767			14812												
		STD	0600	0509	3499	2768	0004977	0499	14813												
		STD	0700	0476	3499	2772	0004684	0548	14816												
034		OBS	0771	0455	34980	2773			14819												
		STD	0800	0446	3498	2774	0004498	0594	14820												
		STD	0900	0418	3496	2776	0004406	0638	14824												
034		OBS	T0997	0399	34954	2777			14833												
		STD	1000	0399	3495	2777	0004315	0682	14833												
		STD	1100	0387	3495	2778	0004267	0725	14845												
034		OBS	T1178	0383	34952	2779			14856												

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DATE DDMMYY	MARSDEN SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH BDTOM	MAX. DEPTH OF S'WPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER			
CTRY CODE	ID. NO.					10"	1"	MO	DAY		HR.	1/10			CRUISE NO.	STATION NUMBER	DIR.	HGT		PER	SEA		TYPE	AMT	
31	540	EV	4217 N	04821 W		149	28	05	24	112	1965	003	9399		3658	12	28	4	2		X2	6	8		0165
						WATER		WIND		AIR TEMP. °C															
						COLOR CODE	TRANS. UNIT	DIR.	SPEED OR FORCE	BARO- METER (mb)	DRY BULB		WET BULB		VIS. CODE	NO. OBS. DEPTH	SPECIAL OBSERVATIONS								
									27	519	102	061	050	8	12										

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	SUN INDX	MARSDEN SQUARE		STATION TIME IGMT		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S.M.P.L.'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NDDC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MD	DAY		HR.	1/10			CRUISE NO.	STATION NUMBER	DIR	HGT		PER	SEA	
31	540	EV	4227 N	04841 W		149	28 05	24 135	1965	003	9400	3237	11	29	4	2		X1	8	7		0166
						WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS				
						COLOR CODE	TRANS. IMI	DIR.	SPEED OR FORCE	(mba)		DRY BULB	WET BULB									
								29	518	105	050	044	8	13								



REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DATE INDEX	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER				
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER	SEA		TYPE	AMT					
31	540	EV	4249 N	04902 W	149	29	05	24	164	1965	003	9401	2542	11	30	4	3			X1	3	7	0167				
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS													
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO-METER (mb)		DRY BULB	WET BULB	VIS. CODE													
									29	520	105	067	050	8	09												
MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta C$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - at/l$	TOTAL-P $\mu g - at/l$	NO <sub>2</sub> -N $\mu g - at/l$	NO <sub>3</sub> -N $\mu g - at/l$	SiO <sub>4</sub> -Si $\mu g - at/l$	pH										
164		STD	0000	0452	3343	2650	0015384		0000	14669																	
		OBS	0000	0452	33425	2650				14669																	
		STD	0010	0391	3345	2659	0014604		0015	14646																	
		STD	0020	0340	3348	2666	0013915		0029	14626																	
		STD	0030	0297	3353	2674	0013170		0043	14610																	
164		STD	0050	0239	3364	2687	0011877		0068	14589																	
		OBS	0056	0229	33684	2692				14587																	
		STD	0075	0296	3396	2708	0009942		0095	14623																	
		STD	0100	0373	3429	2727	0008182		0118	14664																	
		STD	0125	0438	3456	2742	0006837		0137	14699																	
164		STD	0150	0490	3479	2754	0005717		0152	14728																	
		OBS	0150	0490	34789	2754				14728																	
		STD	0200	0489	3486	2760	0005230		0180	14737																	
		STD	0250	0487	3491	2764	0004900		0205	14745																	
		STD	0300	0486	3495	2767	0004644		0229	14753																	
164		OBS	T0338	0485	34963	2768				14759																	
164		OBS	0399	0462	34967	2771				14760																	
		STD	0400	0462	3497	2772	0004331		0274	14760																	
		STD	0500	0448	3498	2774	0004204		0316	14771																	
164		OBS	T0599	0434	34984	2776				14781																	
		STD	0600	0434	3498	2776	0004146		0358	14782																	
		STD	0700	0420	3498	2777	0004084		0399	14792																	
164		OBS	0797	0408	34971	2778				14803																	
		STD	0800	0408	3497	2778	0004107		0440	14804																	
		STD	0900	0394	3496	2778	0004140		0481	14814																	
		STD	1000	0383	3494	2778	0004203		0523	14826																	
164		OBS	T1015	0382	34941	2778				14828																	
		STD	1100	0375	3495	2779	0004180		0565	14840																	
164		OBS	T1103	0375	34945	2779				14840																	

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	DATE INDEX	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER		
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR	HGT	PER		SEA	TYPE		AMT	
31	540	EV	4303 N	04916 W	149	39	05	24	192	1965	003	9402	1353	10	29	3	3		X	X		0168		
		WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS												
		COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mb)		DRY BULB	WET BULB															
						25	517	112	061	044	8	10												
MESSAGE TIME OF HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY- $\sigma_t$		$\Sigma \Delta C$ DYN. M. $\times 10^3$	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P $\mu g - at/l$	TOTAL-P $\mu g - at/l$	NO <sub>2</sub> -N $\mu g - at/l$	NO <sub>3</sub> -N $\mu g - at/l$	SiO <sub>4</sub> -Si $\mu g - at/l$	pH							
192		STD	0000	0290	3347	2669	0013579		0000	14601														
		OBS	0000	0290	33466	2669				14601														
		STD	0010	0263	3359	2682	0012427		0013	14593														
		STD	0020	0243	3371	2693	0011366		0025	14587														
192		STD	0030	0228	3382	2703	0010421		0036	14584														
		OBS	0048	0218	34011	2719				14585														
		STD	0050	0220	3403	2720	0008780		0055	14586														
		STD	0075	0249	3428	2738	0007132		0075	14607														
192		OBS	0086	0263	34371	2744				14616														
		STD	0100	0285	3445	2748	0006168		0092	14629														
192		OBS	0120	0313	34553	2754				14645														
		STD	0125	0317	3457	2755	0005567		0106	14648														
		STD	0150	0338	3466	2760	0005106		0120	14662														
		STD	0200	0369	3479	2767	0004474		0143	14686														
192		OBS	T0216	0376	34822	2769				14692														
		STD	0250	0378	3483	2770	0004310		0165	14698														
		STD	0300	0380	3484	2770	0004302		0187	14707														
192		OBS	0354	0381	34857	2771				14717														
		STD	0400	0380	3487	2773	0004169		0229	14724														
		STD	0500	0377	3488	2774	0004153		0271	14740														
192		OBS	T0542	0376	34888	2774				14746														
		STD	0600	0374	3489	2775	0004136		0312	14755														
		STD	0700	0371	3489	2775	0004185		0354	14770														
192		OBS	0715	0370	34892	2775				14773														
		STD	0800	0368	3490	2776	0004170		0396	14786														
		STD	0900	0367	3490	2776	0004245		0438	14802														
192		OBS	T0939	0366	34901	2776				14808														
		STD	1000	0365	3490	2776	0004299		0481	14818														
192		OBS	T1028	0365	34901	2776				14823														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	MARS SQUARE	STATION TIME (GMT)				YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. ND.					10"	1'	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE		AMT
31	540	EV	4310 N	05004 W	150	30	05	24	239	1965	003	9403	0064	00	22	3	2		X1	3	3		0169
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARD- METER (mba)	DRY BULB	WET BULB	VIS. CODE										
								23	S12	091	056	033	8	03									
MESSAGE TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	D <sub>2</sub> ml/l	PD <sub>4</sub> -P µg - al/l	TOTAL-P µg - al/l	NO <sub>2</sub> -N µg - al/l	NO <sub>3</sub> -N µg - al/l	SiD <sub>4</sub> -Si µg - al/l	pH	S CC						
		STD	0000	0328	3300	2629	0017421	0000	14611														
239		OBS	0000	0328	33000	2629			14611														
		STD	0010	0327	3300	2629	0017441	0017	14612														
239		OBS	0010	0327	32997	2629			14612														
		STD	0020	0296	3301	2632	0017086	0035	14601														
		STD	0030	0236	3304	2640	0016387	0051	14577														
239		OBS	0049	0039	33135	2660			14493														

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DAFT INCHES	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S			DEPTH BOTTOM	MAX. DEPTH OF S'AMPL'S	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER	
CTRY CODE	ID. ND.					10"	1'	MO	DAY	HR. 1/10		CRUISE NO.	STATION NUMBER	DIR			HGT	PER	SEA		TYPE	AMT		
31	540	EV	4257 N	05004 W		150	20	05	25	010	1965	003	9404	0128	01	22	4	2		X1	3	2	0170	
						WATER		WIND		AIR TEMP. °C			NO. OBS. DEPTHS		SPECIAL OBSERVATIONS									
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARD- METER (mba)	DRY BULB		WET BULB	VIS. CODE										
								22	S12	098	056		033	8	03									
MESSAGE TIME HR 1/10	CAST ND.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	D <sub>2</sub> ml/l	PD <sub>4</sub> -P μg - al/l	TOTAL-P μg - al/l	NO <sub>3</sub> -N μg - al/l	NO <sub>3</sub> -N μg - al/l	SiD <sub>4</sub> -Si μg - al/l	pH	S CC							
010		STD	0000	0303	3301	2632	0017164	0000	14600															
		OBS	0000	0303	33006	2632			14600															
		STD	0010	0170	3315	2654	0015075	0016	14546															
		STD	0020	0062	3327	2670	0013508	0030	14501															
010		OBS	0024	0025	33312	2675			14485															
		STD	0030	0026	3332	2676	0012906	0044	14486															
		STD	0050	0028	3336	2679	0012616	0069	14491															
		STD	0075	0031	3341	2683	0012245	0100	14497															
010		OBS	0097	0033	33456	2687			14503															

REFERENCE		SHIP CODE	LATITUDE * 1/10	LONGITUDE * 1/10	OBS PROJECT	MARS SQUARE		STATION TIME (GMT)		YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. ND.					10"	1'	MO	DAY		HR.1/10	CRUISE NO.			STATION NUMBER	DIR	HGT	PER		SEA	TYPE	
31	540	EV	4244 N	05004 W		150	20	05	25 024	1965	003	9405	0845	06	26	3	3		X1	4	2	0171
						WATER		WIND		AIR TEMP. °C		NO. OBS. DEPTHS		SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OF FORCE	BARD-METER (mba)	DRY BULB	WET BULB	VIS. CODE									
								24		S16	105	044	039	8	07							
MESSAGE TIME HR 1/10	CAST ND.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	D <sub>2</sub> ml/l	PD <sub>4</sub> -P μg - at/l	TOTAL-P μg - at/l	ND <sub>2</sub> -N μg - at/l	NO <sub>3</sub> -N μg - at/l	Si D <sub>4</sub> -Si μg - at/l	pH	S CC					
024		STD	0000	0165	3299	2641	0016256	0000	14540													
		OBS	0000	0165	32990	2641			14540													
		STD	0010	0165	3300	2642	0016219	0016	14541													
024		STD	0020	0165	3300	2642	0016182	0032	14543													
		OBS	0025	0165	33002	2642			14544													
		STD	0030	0149	3316	2656	0014863	0048	14540													
024		OBS	0047	0108	33619	2695			14531													
		STD	0050	0113	3365	2697	0010914	0074	14534													
		STD	0075	0150	3385	2711	0009642	0099	14557													
024		STD	0100	0184	3404	2724	0008452	0122	14579													
		STD	0125	0216	3421	2735	0007420	0142	14599													
		OBS	0144	0238	34329	2743			14614													
024		STD	0150	0244	3435	2744	0006602	0159	14618													
		STD	0200	0287	3449	2751	0005949	0191	14646													
		STD	0250	0323	3462	2758	0005341	0219	14672													
024		STD	0300	0352	3472	2763	0004915	0245	14694													
		OBS	0382	0384	34837	2769			14723													
		STD	0400	0384	3484	2770	0004434	0291	14726													
024		STD	0500	0383	3487	2772	0004291	0335	14742													
		OBS	T0572	0382	34880	2773			14754													
		STD	0600	0380	3488	2773	0004276	0378	14758													
024		OBS	T0616	0378	34879	2773			14759													

REFERENCE		SHIP CODE	LATITUDE 1/10	LONGITUDE 1/10	DRIFT INDICATOR	MARSDEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'MPL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR.1/10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4213 N	05005 W		150	20	05	25	057	1965	003	9406	3109	11	25	2	3		X1	4	2	0172
						WATER		WIND		AIR TEMP. °C				VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS							
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	BARO- METER (mba)	DRY BULB	WET BULB											
								25		S11	102	056	044	8	10								
MESSNGR TIME OF HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		Σ Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>2</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH	S C C					
		STD	0000	0452	3317	2630	0017324		0000	14666													
057		OBS	0000	0452	33167	2630				14666													
		STD	0010	0419	3317	2634	0016974		0017	14654													
		STD	0020	0394	3317	2636	0016719		0034	14645													
057		OBS	0025	0384	33176	2638				14641													
		STD	0030	0395	3331	2647	0015707		0050	14648													
		STD	0050	0436	3380	2682	0012451		0078	14676													
		STD	0075	0489	3426	2712	0009578		0106	14708													
		STD	0100	0541	3456	2730	0007953		0128	14738													
057		OBS	0121	0585	34688	2735				14761													
		STD	0125	0572	3469	2736	0007390		0147	14756													
057		OBS	0145	0539	34694	2741				14746													
		STD	0150	0555	3473	2742	0006912		0165	14754													
057		OBS	0193	0664	35023	2751				14808													
		STD	0200	0655	3502	2752	0006080		0197	14806													
		STD	0250	0598	3500	2758	0005565		0226	14791													
		STD	0300	0549	3499	2763	0005096		0253	14779													
057		OBS	T0389	0482	34968	2769				14766													
		STD	0400	0479	3497	2770	0004543		0301	14767													
		STD	0500	0453	3497	2773	0004344		0346	14773													
057		OBS	0587	0429	34969	2775				14777													
		STD	0600	0423	3496	2775	0004167		0388	14777													
		STD	0700	0387	3492	2776	0004148		0430	14778													
057		OBS	0789	0366	34905	2777				14783													
		STD	0800	0366	3491	2777	0004073		0471	14785													
		STD	0900	0366	3491	2777	0004153		0512	14802													
		STD	1000	0365	3491	2777	0004234		0554	14818													
057		OBS	1017	0365	34913	2777				14821													
		STD	1100	0364	3492	2778	0004232		0596	14835													
057		OBS	T1129	0364	34920	2778				14839													

REFERENCE		SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	DRIFT INDICATOR	MARS DEN SQUARE		STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF S'PL'S	WAVE OBSERVATIONS				WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
CTRY CODE	ID. NO.					10"	1"	MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA		TYPE	AMT	
31	540	EV	4140 N	05004 W		150	10	05	25	115	1965	003	9407	3566	11	31	2	2		X1	4	2	0173
						WATER		WIND		BARO- METER (mb)	AIR TEMP. °C		VIS. CODE	NO. OBS. DEPTHS	SPECIAL OBSERVATIONS								
						COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE		DRY BULB	WET BULB											
									32 <td>S14</td> <td>115</td> <td>106</td> <td>067</td> <td>8</td> <td>09</td> <th colspan="6"></th>	S14	115	106	067	8	09								
MESSENGER TIME HR 1/10	CAST NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>		S Δ D DYN. M. X 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PO <sub>4</sub> -P μg - ml/l	TOTAL-P μg - ml/l	NO <sub>2</sub> -N μg - ml/l	NO <sub>3</sub> -N μg - ml/l	SiO <sub>4</sub> -Si μg - ml/l	pH	S C C					
		STD	0000	1515	3600	2673	0013277		0000	15091													
	115	OBS	0000	1515	35998	2673				15091													
		STD	0010	1515	3600	2672	0013311		0013	15092													
		STD	0020	1515	3600	2672	0013354		0027	15094													
		STD	0030	1515	3599	2672	0013388		0040	15096													
		STD	0050	1514	3599	2672	0013466		0067	15099													
	115	OBS	0059	1514	35990	2672				15100													
		STD	0075	1481	3593	2675	0013288		0100	15092													
		STD	0100	1430	3583	2678	0013035		0133	15078													
		STD	0125	1381	3575	2682	0012697		0165	15065													
		STD	0150	1333	3567	2686	0012396		0197	15053													
	115	OBS	0195	1249	35544	2693				15030													
		STD	0200	1241	3553	2694	0011777		0257	15028													
		STD	0250	1153	3542	2702	0011076		0314	15005													
	115	OBS	T0252	1149	35418	2703				15004													
		STD	0300	1009	3527	2717	0009763		0366	14960													
	115	OBS	0385	0805	35080	2735				14895													
		STD	0400	0778	3507	2738	0007765		0454	14887													
		STD	0500	0626	3501	2755	0006215		0524	14844													
	115	OBS	T0575	0545	34989	2763				14823													
		STD	0600	0534	3499	2765	0005292		0581	14823													
		STD	0700	0494	3500	2770	0004833		0632	14823													
	115	OBS	0771	0470	35001	2773				14825													
		STD	0800	0462	3499	2773	0004621		0679	14826													
		STD	0900	0436	3498	2775	0004478		0725	14832													
	115	OBS	T0987	0417	34962	2776				14838													
		STD	1000	0414	3496	2776	0004454		0770	14839													
		STD	1100	0397	3495	2777	0004412		0814	14849													
	115	OBS	1126	0393	34944	2777				14851													

REFERENCE CTRY CODE	ID. NO.	SHIP CODE	LATITUDE ° 1/10	LONGITUDE ° 1/10	OBS. INDCTR	MARSDEN SQUARE	STATION TIME (GMT)			YEAR	ORIGINATOR'S		DEPTH TO BOTTOM	MAX. DEPTH OF SAMPLE	WAVE OBSERVATIONS			WEA- THER CODE	CLOUD CODES		NODC STATION NUMBER
							MO	DAY	HR./10		CRUISE NO.	STATION NUMBER			DIR.	HGT	PER	SEA	TYPE	AMT	

31	540	EV	4232 N	05011 W	150	20	05	25	168	1965	003	9408	2614	12	24	1	2		X1	0	1	0174
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WATER		WIND		BARO- METER		AIR TEMP. °C		VIS. CODE	ND. OBS. DEPTHS	SPECIAL OBSERVATIONS
COLOR CODE	TRANS. (m)	DIR.	SPEED OR FORCE	(mba)	DRY BULB	WET BULB				
			26	S12	098	061	044	8	12	

MESSAGE TIME HR 1/10	CARD NO.	CARD TYPE	DEPTH (m)	T °C	S ‰	SIGMA-T	SPECIFIC VOLUME ANOMALY-σ <sub>t</sub>	Δ D DYN. M. x 10 <sup>3</sup>	SOUND VELOCITY	O <sub>2</sub> ml/l	PD <sub>4</sub> -P μg - dl/l	TOTAL-P μg - dl/l	ND <sub>2</sub> -N μg - dl/l	ND <sub>3</sub> -N μg - dl/l	SiO <sub>4</sub> -Si μg - dl/l	pH	S C
168		STD	0000	0435	3334	2645	0015882	0000	14661								
		OBS	0000	0435	33336	2645			14661								
		STD	0010	0422	3336	2649	0015551	0016	14657								
		STD	0020	0396	3339	2654	0015089	0031	14649								
		STD	0030	0357	3342	2660	0014520	0046	14634								
168		OBS	0032	0348	33427	2661			14631								
		STD	0050	0232	3375	2697	0010990	0071	14588								
168		OBS	0052	0225	33788	2700			14586								
		STD	0075	0330	3431	2733	0007604	0095	14642								
		STD	0100	0443	3459	2744	0006643	0112	14698								
168		OBS	0112	0498	34625	2740			14723								
		STD	0125	0444	3457	2742	0006826	0129	14702								
168		OBS	0128	0433	34560	2742			14698								
		STD	0150	0439	3462	2746	0006418	0146	14704								
		STD	0200	0451	3474	2755	0005707	0176	14719								
		STD	0250	0464	3483	2760	0005227	0203	14734								
168		OBS	0276	0470	34856	2762			14741								
		STD	0300	0434	3486	2766	0004707	0228	14730								
168		OBS	T0381	0426	34887	2769			14741								
		STD	0400	0454	3494	2770	0004463	0274	14756								
168		OBS	0411	0468	34973	2771			14764								
		STD	0500	0432	3495	2773	0004243	0318	14764								
		STD	0600	0402	3493	2775	0004150	0360	14767								
168		OBS	0619	0397	34929	2775			14769								
		STD	0700	0385	3492	2776	0004103	0401	14777								
		STD	0800	0375	3492	2777	0004139	0442	14789								
168		OBS	T0831	0373	34912	2777			14793								
		STD	0900	0374	3492	2777	0004195	0484	14805								
		STD	1000	0375	3493	2777	0004234	0526	14822								
168		OBS	T1058	0375	34930	2778			14832								
		STD	1100	0369	3492	2778	0004292	0569	14837								
168		OBS	1171	0353	34906	2778			14842								













